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A QUARTERLY JOURNAL OF MARITIME HISTORY

1949
OCTOBER

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THE AMERICAN NEPTUNE

A Quarterly Journal *of Maritime History*

VOLUME IX OCTOBER 1949 NUMBER 4

DURING *the past five years the Naval Historical Foundation has made available in excellent reproduction several documents of outstanding maritime and naval interest. In 1944 a facsimile of* Rules for the Regulation of the Navy of the United Colonies of North-America *(Philadelphia, 1775)—the first printed document relating to the United States Navy—was issued, and the following year a contemporary tinted French engraved map showing the joint land and sea situation about Yorktown in September and October 1781 was handsomely reproduced. This very decorative map was accompanied by a note on Washington's grand strategy by Commodore Dudley W. Knox, who has been the guiding spirit of the Foundation since its incorporation in 1926. A recruiting broadside issued by John Paul Jones in 1777, in connection with the fitting out of the ship* Ranger *at Portsmouth, New Hampshire, for a cruise to France, was reproduced in facsimile, while Commander Nathan Sargent's contemporary narrative* Admiral Dewey and the Manila Bay Campaign *was published in a limited edition. Now the Foundation has selected for reproduction one of the rarest of all American historical prints—the mezzotint of Boston Light, engraved by William Burgis in 1729 and dedicated by him to*

the merchants of Boston. This view, which shows an armed sloop lying off the light, has been faithfully reproduced in collotype by the Meriden Gravure Company, and will shortly be distributed to members of the Foundation. No copies will be placed on sale, but as the Foundation cordially welcomes new members that should prove no obstacle. Information regarding membership will gladly be sent upon application to Captain A. D. Turnbull, Secretary, Naval Historical Foundation, Navy Department, Washington 25, D. C.

Although the efforts of the Foundation have thus far chiefly been devoted to the collection, preservation and publication of material relating to the history and traditions of the United States Navy and the merchant marine, plans are well advanced for the opening of a naval museum, in the rear of the Truxtun-Decatur House in Lafayette Square, Washington, where many of the Foundation's possessions will shortly be exhibited.

The Editors, as is customary at this season, make their annual request for prompt renewal of subscriptions for the coming year, and repeat their suggestion regarding the appropriateness of Christmas gift subscriptions to THE AMERICAN NEPTUNE.

Mr. John W. Marchi is once more in a position to accept orders for bound volumes of the NEPTUNE. *Readers who wish to have the standard blue buckram binding are requested to notify him at 105 Middle Street, Portland 6, Maine, enclosing a self-addressed postcard. As in former years, the price for binding will be $2.50 per volume, postpaid. When Mr. Marchi returns the readers' postcards, they should send him their four numbers of the* NEPTUNE, *in exchange for which he will forward the single 1949 volume which he has previously bound from sheets held at the Press. Thus delays should be greatly reduced.*

The Attack on the Marquis

BY JAMES DUNCAN PHILLIPS

THE pepper trade direct with the northwest coast of Sumatra was discovered and opened up by the merchants of Salem during the last decade of the eighteenth century. For over fifty years it was a great mainstay of the Salem commerce. Comparatively little of the millions of pounds of pepper brought home stayed in Salem. A few cargoes were carried direct to European ports but most of them came to Salem and were divided up among vessels going to the various ports of the Baltic and the Mediterranean. Not only did the Salem merchants who traded elsewhere than to the Far East buy pepper to fill out their cargoes but merchants all down the coast as far south as Baltimore were sending to Salem for pepper to use in their European ventures. The drawback books of the Salem Custom House show innumerable entries for the refund of duties on pepper to Salem merchants for shipments out from other ports.

From 1799 to 1846 pepper ships came into Salem every year except during the war years 1812-1815 and 1822 and 1837. During the latter two years Salem ships in the pepper trade which might have come to Salem were diverted to other ports. Willard Peele and his father were first in the trade but John and Samuel Derby, Stephen Phillips, Joseph Peabody, Nathaniel West and many others had a hand in it. Nathaniel Bowditch made a successful voyage in command of the ship *Putnam* and was a part owner of her on her next voyage when she was actually captured by Malays and never recovered in spite of a valiant attempt.

Both the capture of the ship *Putnam* and the attempt on the ship *Marquis de Somerulas* occurred somewhat off the usual course of the Salem pepper ships. Most ships sailed direct to the northwest coast and made their landfall at Hog Island about one hundred miles south of the northern tip of the island and then explored along the coast to see where they could get a cargo. If, however, it was too late in the season for the crop there, or the crop had been poor, the next resort was to drop down to the Straits of

Sunda, pass through and cruise along the east coast of Sumatra through the Banka Strait and see if any pepper could be obtained there. That was what *Putnam* did and what Captain Story was doing when the episode about to be related occurred. Unlike the northwest coast which is high and mountainous this region is low and swampy, the deltas of large rivers, and the pepper must be brought down from the higher land inland which caused delay. Moreover just north of the Banka Strait and south of where the city of Singapore now is, there are many islands whose inhabitants had a bad name as the bloodthirstiest of the whole lot of Malay pirates. The Malays were treacherous, bloodthirsty and cruel to the last degree but they had also two excellent qualities which made them only more dangerous, they were inventive and very courageous. When some humanitarian remarked to Nathaniel Bowditch that the Malays no doubt acquired their vices from the Europeans, he replied it was entirely unnecessary as they had plenty of their own.

The pirates of the east coast seem to have been largely seagoing brigands while those of the northwest coast usually put out in small boats from the shore to do their deviltry. Occasionally a small fleet of pirates, like that which attacked the ship *Franklin* in 1819, cruised the Banka Strait. The home port of the cruising pirates appears to have been Lingen Island but the neighboring islands no doubt furnished their quotas.

Mostly, however, the Malays relied on treachery and surprise. A genial group got on board a ship to discuss trade, handle pepper or for some other excuse. At a given signal each ripped out a concealed creese from his clothing and cut down the sailor or officer nearest him while any Malays who had remained in the boat alongside now swarmed on board and completed the massacre. Or perhaps some brave member of the crew may have awakened to the situation in time; a bloody fight ensued and the Malays were driven overboard to swim to their boat.

The pattern was always similar and could always be prevented by simple rules—never allow more than three or four Malays on board, have one or two men standing to arms while they were there, and not allow the Malay boats except the one unloading to lay alongside. It is, however, mighty hard to be eternally vigilant in an apparently peaceful country for eight or ten weeks especially with the temperature ranging in the nineties, the atmosphere that of a vapor bath and perhaps some of the best men aboard down with malaria or dysentery or some other tropical disease. Those who have been in the tropics know how easy it is not to care much about anything and it is remarkable that more attacks did not develop and that so very few were successful.

About 1800 there was launched in Charlestown a ship named *Marquis de Somerulas* though why a perfectly good Yankee ship was given such an outlandish name seems hard to explain. It turns out, however, that the Marqués de Someruelos[1] was a Spanish grandee who just then was governor of Cuba, so probably someone thought it would be good business to name a ship for him. She was presently owned by John and Richard Gardner, the first of whom built the beautiful Pingree House, now owned by the Essex Institute in Salem.

She was first commanded by Captain William Story, a man of large, powerful physique, fair complexion, with a commanding speaking-trumpet voice and a cheery, cordial, hearty manner. He was just the sort of man one thought of as an able commander and excellent seaman and he was all of that. He was a son of Dr. Elisha Story who had been a surgeon in Washington's army and had then settled in Marblehead. He was a half brother of Justice Joseph Story, a colleague of John Marshall of the United States Supreme Court.

The ship *Marquis de Somerulas* was large as ships then went in New England and was rated at 359 tons when she was registered in Salem in 1802. Curiously she does not seem to have arrived at or sailed from Salem till after the voyage about to be described, which was five years later. Captain Story was twenty-seven when he took command of her and she is mentioned in the Salem ship news as being in various ports of the world but as she did not visit Salem or perhaps any American port, it is not easy to trace her early adventures. If Captain Story went to sea at twelve or thirteen as most boys did, he had had plenty of experience before he went on this eventful voyage. No doubt he had been more than once to Sumatra either as mate or seaman or master.

In the latter part of September in 1807 Captain Story had been trading up the River Jamba on the east coast of Sumatra. He had had much trouble collecting enough pepper to fill his ship and among others got in touch with a rajah some seventy miles up river to whom he advanced money for pepper to be delivered. This was an error. No pepper was forthcoming and Captain Story proceeded the seventy miles up river to secure delivery. Apparently one of the Sultan's messengers went with him to help and eventually the recalcitrant rajah agreed to deliver and loaned one of his proas to take the cargo on board the ship. Captain Story was offered a passage and accepted it but found she was very clumsy and slow, so hailed a passing small proa to take him to the ship.

[1] Although the gentleman spelled his name Someruelos, the ship appeared in the Salem ship registers as *Marquis de Somerulas*, and consequently that form has been followed in this article.

This did not suit the men on the big proa who evidently counted on his presence to get them safely by the fort a few miles downstream. Two of the crew even insisted on getting into the small proa but he would not take them and they compromised by his agreeing to see the commander of the fort and tell him they were bringing pepper to the ship. He stopped at the fort as agreed but as it was still fifty miles to the ship, he urged his rowers on till the tide turned against them at twelve o'clock when they anchored and all went to sleep. He rightly remarks that if these people contemplated treachery, this was certainly their chance, but the night passed quietly and they reached the ship at about ten o'clock next morning.

At the ship he found three large proas all discharging cargo on board and two others waiting to unload. He never allowed more than one of these proas alongside at once as they carried too many men for safety. There were more than two hundred Malays on these three proas and that would have been altogether too many for his crew of not over twenty-five or thirty to handle. However Captain Story had traded with these men on previous voyages, knew them well and did not anticipate any trouble nor was there any. It should be said that these proas are the river and coastwise trading craft of the Malay Archipelago. They are vessels propelled by oars, paddles and lateen sails, and are of all sizes from small, light craft easily paddled to large, lumbering sailing vessels capable of carrying much cargo.

Early the next morning another of the local proas arrived but before she started unloading, the proa which Captain Story abandoned when he took the light, swift craft came alongside. Immediately the local proa cast off and drew away from the ship with the explanation that they could not unload till their merchant was at hand to see the pepper weighed. Captain Story wanted them to unload first and was a little surprised but the explanation was a not unusual one and he thought nothing of it till later. Meanwhile some canisters of sugar, coffee and other things bought for ship's supplies had been unloaded from the large upriver proa and left on deck. Presently the ship's crew went to dinner during which time the small upriver proa came alongside. When the men came on deck after dinner, they found one of the canisters of sugar broken open but could not find out who did it, so they went to loading the pepper.

There were only fourteen Malays in the two crews—some in the proas, some on deck and all passing pepper aboard. The two officers and most of the crew were sent below to stow cargo. On deck remained only Mr. Bromfield, the carpenter, and one seaman helping him to guide the Malays with

the cargo, the cook and steward attending to their duties in the galley, and the Captain. Presently the Captain went below to give some particular instructions for stowing the cargo.

It should be explained that the ship had two decks. Below the lower deck was the main cargo hold where the cargo was being stowed. The between decks was devoted to ship's stores and lighter cargo and connected with the men's quarters in the forecastle and the captain's and officers' cabin aft. There were companionways to the upper deck both fore and aft but while the main cargo hatch ran clear through both decks, the between deck could only be reached up a ladder from the lower hold—not a nice thing to climb if a Malay with a creese stood at the top. The only other way from the hold to the between decks was from the magazine which, however, was boarded off from the hold.

Soon after the Captain went below, Mr. Bromfield saw a Malay sitting on the larboard hen coop with his clothes wrapped clumsily about him and thought he might have concealed the stolen sugar in his garments. When Mr. Bromfield approached to search him, the fellow ripped a creese out of his clothes and stabbed him through the heart. As he fell he yelled 'I've been creesed.' The sailmaker went to his rescue and was attacked by the same man and was badly wounded as he ran and jumped down the main hatchway. Other Malays attacked the carpenter and the other seaman who jumped into one of the ship's boats tied alongside and pulled away to shore. Several more armed Malays had evidently climbed aboard meanwhile and had now complete possession of the upper deck.

Captain Story, standing on the lower deck near the main hatch, heard Mr. Bromfield's despairing cry, and a moment later the wounded and bloody sailmaker scrambling down the hatch made altogether too clear what was happening on the upper deck. Several men trying to gain the upper deck were wounded in the hatchways and driven below again. The captain then called all men aft and ran to his cabin to get his sword and pistols. As he started to lead the men up the companionway two heavy boarding pikes were hurled down so hard that they stood quivering in the floor but he dodged back just in time to avoid them. Meanwhile the second officer in the hold, finding all the ladders guarded by Malays, broke into the magazine and got up to the between decks that way. He came aft also and Captain Story gave the Malay rallying cry as if they were about to charge up the steps, and the Malays replied with their rally from the deck.

Unfortunately the arms chest was kept on the upper deck to have it handy for attacks and just the present contingency had not been foreseen.

They could only find three pistols and three swords below and the pistols were not effective as cartridges could not be found and they had to be loaded with powder. Nevertheless they succeeded in shooting two Malays through the companionway and thereafter the Malays kept well out of sight. The Captain gave his rallying cry again and this time there was no response. The chief officer went to the main hatch and looked about cautiously and finally let the men boost him up so he could look around on deck only to find the Malays gone. Then they all rushed on deck and to the arms chest to pursue the Malays in the boats only to find that every musket, pike and cutlass had been stolen or thrown overboard. Then they tried to get a gun to bear on the pirate craft, but the decks were so cluttered with empty ballast casks, it was hard to aim the gun properly and it did no execution.

When they came to count their losses they found Mr. Bromfield's body wedged between two barrels of beef, but the cook and the steward had absolutely disappeared. Whether the Malays killed them and threw them overboard or carried them away as slaves, they never found out. Aside from pillaging the arms chest and stealing a few other things the ship suffered no damage.

Word somehow reached the shore of the fracas and presently ten proas full of men came out ostensibly to help, but the Captain was very cautious about admitting more than three or four men aboard. He sent word to the head man on shore and he immediately despatched several proas in pursuit of the murderers but apparently nothing came of it.

'I find every attention paid me by the Sultan and the head men,' wrote Captain Story. 'I therefore have no reason to suspect the Sultan knew anything of such an act going forward. The men who rose upon the ship belonged high up on the river Jamba.'

He tried to finish up his affairs as soon as possible and leave the river but a day or so later a man came aboard ostensibly with things to sell who asked so many questions that the captain suspected him of being a spy. He therefore decided to leave immediately and actually did so without the assistance of any pilot.

The ship *Marquis de Somerulas* did not return to Salem but went directly to Europe to dispose of her cargo. In spite of this episode, the voyage was far from being unsuccessful. There is in the Essex Institute a private book of the ships accounts of Richard and John Gardner, Jr., which gives some interesting figures and, while it is hard to see just how these accounts were kept, the facts are these:

Cargo sold in Hamburg and Russia	$126,875.51
Net cost of the voyage	27,123.81
	$ 99,751.70

A little notation by John, Jr., whose book it evidently was, presents the pleasant picture

My 3/4	$74,813.78
1/4 to Richard	24,937.92
	$99,751.70

Not at all bad for a year's trading!

This seems to have been the last pepper voyage of the ship *Marquis de Somerulas* but she made many voyages to Europe and elsewhere. Her principal owner had less good fortune as time went on and had to give up the beautiful house he had built. Just before the war of 1812 he made a large venture in the ship *Marquis de Somerulas* and went in the vessel himself. All went well and he would have handsomely recovered his fortune had not war been suddenly declared.

The ship left Gibraltar in May 1812 but with Gardner's fortune was carried into Halifax as a British prize. So ended the career of *Marquis* as an American ship.

It really has nothing to do with the pepper trade except to present another phase of Malay piracy of the southeast coast but the voyage of the brig *Franklin* does illustrate the undying spirit of adventure which seemed to urge on Salem merchants and captains to seek out new lines of trade even when they were making plenty of money in what they were doing.

In January 1819 Captain John White took the brig *Franklin* out on a voyage to Cochin China. Two or three Salem captains had attempted to start trade with Saigon but had found the restrictions of the native rulers very burdensome. However Captain White and his group of owners thought it worth while to try again and he cleared for the East Indies to find a market for his cargo. By May they had rounded the Cape of Good Hope and sighted Java Head. They passed through the Straits of Sunda and anchored for a few days in the roadstead of Batavia to get a little recreation on shore after their long voyage.

A day or two after leaving Batavia they were heading up the Banka Straits with the vast swamp lands which form the delta of the Palembang River of Sumatra on the port side and the beaches of Banka Island backed by broken ridges of high land to starboard. Presently they sighted three very large proas evidently making toward them. Each had two banks of

oars and they counted thirty-seven oars on a side on the largest one. It was estimated that they had at least a hundred and eighty-five oars which would imply well over two hundred men in the three vessels. Each had a heavy bulwark across the bow with the muzzle of a large cannon projecting through it. They flew dark blue flags with white borders on three sides and the largest had a long blue and white striped pennant.

It seemed likely that these were some of the pirates whose bloodthirsty cruelty had been detailed in the bazaars in Batavia. It was reported that they immediately murdered all the Lascars (native sailors) on the ships they captured and then amused themselves torturing the Europeans to death with the most fiendish cruelty. These rowing galleys had a tremendous advantage in light airs for they could attack from any direction while a ship without wind lay helpless.

Unfortunately this day there was hardly enough wind to keep the brig moving and give steerage way. The Captain fired a ranging shot as they approached to determine the range of his six pounders. It fell a little short but seemed to be the signal for them all to rush upon the little brig, but they were promptly greeted with a broadside from *Franklin's* six pounders. One shot fell just short but ricochetted into the largest proa and the advance paused. The brig was drifting toward a shoal on the Sumatra side but luckily a breeze sprang up and the Captain had to bear away to avoid it. A squall now broke and with all sail he proceeded on his course which unfortunately took him nearer the pirates who had waited for him. They showed a disposition to attack again and were greeted with another broadside, this time of grape and canister, the shot striking all around them like hail.

Unfortunately at this point Captain White found his gun carriages were giving way. They had been built in Sumatra some years before of wood which while very hard was brittle. One of his guns was now dismounted and two of the others evidently would not be serviceable long. The Malays were now following as fast as they could but their shot fell short and did no damage. However, with the collapse of his artillery, the Captain began to be fearful of what might happen if the wind failed again. His men were outnumbered ten to one if it came to hand-to-hand fighting and they had nothing now but small arms with which to defend themselves if becalmed. He accordingly ran for the protection of a small Dutch town on Banka Island and reported the episode.

The Dutch Resident at once recognized the pirates as Malays from Lingen Island and said that they had recently captured a Chinese brig. It

had been retaken by two Dutch gunboats which had also captured one proa after a desperate fight. The brig and the proa were both beached in the harbor. The guns with which the proas were armed were reported to be eighteen pounders but either they did not have enough powder or were afraid to use a big enough charge to make them effective. With spear and creese, in hand-to-hand fighting, they were very difficult to overcome.

The little port of Minton near the northwest corner of the island was a pleasant little town of about two thousand Chinese and Malays who made a living by farming and fishing and a contraband trade in tin while the Malays along the coast collected bêche-de-mer and edible birds' nests for the Chinese trade. Minton had a small but effective little fort to defend its harbor but the day after *Franklin* put in, a merchantman landed two companies of Dutch soldiers who had been sent to strengthen the post as the Dutch were then at war with the Rajah at Palembang. The Dutch lads were a cheery lot and gave the whole post a distinct feeling of security. Especially when a fisherman came in in the afternoon and reported that the three proas were still outside lying in wait for *Franklin* and that they were especially angry because they had had two men killed and several wounded by the brig's guns.

Captain White decided it was not wise to start out till his battery was thoroughly overhauled and while he was waiting for his gun carriages to be finished a British brig bound for Singapore came in. They agreed to go out together for mutual protection and waited for a favorable wind. One evening a fresh and favorable wind came and they put to sea under full sail. The breeze took them along at a smart clip and at daylight they were clear of the straits and headed for the open sea. Actually they were much nearer the home of the pirates but they had seaway and more important the wind was far more likely to be strong and steady. Anyway they saw no more of the pirates till they parted for their respective destinations. It is interesting to note that these pirates came from the same locality as those who captured *Putnam* fourteen years before.

During the fifty years of the pepper trade there were innumerable brushes between Malays and Salem crews but seven of them were serious enough for the masters to make a fuss about them and report them at home. In one case the Malays captured the ship and got away with it, in two others they captured it but it was recovered. Mostly their attacks resulted in the murder of officers and men and some losses to the Malays as they were driven overboard. It is very possible that there were a great many more adventures which have never been reported. Marine life was

so full of adventure that the repelling of a gang of Malays got lost in the sum total of the great adventures. Having found a letter from the master of a bark describing one attack by Malays, the writer was overjoyed to find the log of the voyage in the Essex Institute and hastily ran down the date of the attack expecting to find a full account. The ship had come to anchor a few days before the attack which happened in the night. The day before the only entry is 'Light airs,' the following day the only entry is 'Spent the day making cartridges to replace those used last night.' These men could not exactly be considered braggarts.

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Pioneer Transatlantic Paddle Steamers

BY H. PHILIP SPRATT

IN the nautical collections at the Science Museum, London, there is a handsome scale model, presented by the Spanish Government, of the *Santa Maria* in which Christopher Columbus sailed in 1492 for an unknown destination. After the success of that immortal adventure, mariners knew for certain that a sail of two or three months westward across the Atlantic would take them to the New World. As the years rolled by, what was once the saltiest adventure of the sea became more and more commonplace, until in 1710 the British Post Office mail packet service commenced operation. In 1816 the Black Ball Line, founded in New York, started their sail packet service to Liverpool; the crossing took 23 days eastward and 40 days westward. As the trade developed, so the vessels were improved, until the Atlantic service was maintained by a fleet of fast sail clippers which was the pride of the mercantile marine about the middle of the nineteenth century.

In the meantime, however, the inventions of Newcomen and Watt were being applied to marine propulsion. The experimental period extended from about 1780 to 1807, when Robert Fulton achieved practical success with the P.S. *Clermont* on the river Hudson. In Europe the first steamer to run commercially was the P.S. *Comet,* of about 25 tons burden, built in 1812 to the order of Henry Bell, which maintained a public service on the river Clyde. Her low-pressure steam engine, constructed by John Robertson of Glasgow, is still preserved in the national collections at the Science Museum.

P.S. *Savannah* (1818)

The first steam-propelled vessel to cross the Atlantic, or indeed any ocean, was the famous American auxiliary P.S. *Savannah,* built of wood at Corlears Hook, New York, by Francis Fickett, and launched on 22 August 1818. This vessel was at first intended for the sail-packet service to

Havre, France; but before completion she was purchased by the newly-formed Savannah Steam Ship Co., and adapted for auxiliary steam propulsion with collapsible paddle-wheels.

The wooden hull of *Savannah* was carvel-built.[1] Her bow was convex and full above water, but finer below.[2] She carried a male bust head[3] above her cut-water, had a raked curved stem, and a plain square transom stern fitted with a narrow square-heeled rudder. The vessel carried three tall masts; her bowsprit was steeved well upward, as shown by a contemporary drawing,[4] to keep it out of the seas when the short hull pitched. The accommodation was divided into two main saloons, handsomely furnished. The state-rooms, with 32 berths, are said to have been commodious, and to have resembled those of a pleasure yacht rather than a steam packet.

To aid her considerable spread of sail, *Savannah* was fitted with an auxiliary steam engine[5] of 90 indicated horsepower, constructed by Stephen Vail at the Speedwell Iron Works, near Morristown, New Jersey. This had one cylinder 40 inches diameter by 5 feet stroke, which was inclined at about 20 degrees so as to act directly onto the paddle shaft. The steam inlet and exhaust pipes were of equal bore, since there was no expansion in the cylinder, and the steam was discharged hot and at full pressure into the jet condenser. The air pump for this condenser worked on the same crosshead as the main piston rod.

Steam was supplied by low-pressure boilers with riveted flues, constructed by Daniel Dod, of Elizabeth, New Jersey. The pressure is said to have been less than one pound per square inch above atmospheric. These boilers had to be blown out once a day, to avoid salt-water concentration. The engine and boiler spaces occupied most of the hold, from the main-mast to the fore-mast, so that little room was left for cargo.[6] The smoke pipe was fitted at the top with an elbow, which could be turned as necessary, to direct the smoke and sparks from the sails.

The paddle-wheels were 15.25 feet diameter, and were made collapsible. Each had ten radial arms, held in position by a pair of chains near the outer ends, but which could be folded up like a fan[4] and taken on deck

[1] Further data on the construction and dimensions of the steamers described will be found in Table I.

[2] Carl W. Mitman, *Catalogue of the Watercraft Collection in the United States National Museum* (Washington, 1923), p. 61.

[3] New York Custom House Records, *Nautical Gazette*, 14 January 1909, p. 27.

[4] Jean B. Marestier, *Mémoire sur les bateaux à vapeur des États-Unis d'Amérique* (Paris, 1824), p. 71.

[5] Further data on the machinery and service of the steamers described will be found in Table II.

[6] Charles F. Partington, *An historical and descriptive account of the steam engine* (London, 1822), p. 68.

when not in use. This operation could be performed in about 20 minutes. The paddle floats were 54 inches long and 32 inches wide, their outer corners chamfered. To prevent inboard splash, each paddle-wheel was provided with a removable canvas cover stretched over an iron frame. The wheels rotated at 16 revolutions per minute, and are said to have propelled the vessel, under steam power alone, at a speed of about 4 knots.

Savannah ran her trials in March 1819 off Staten Island,[7] and was delivered soon after to her home port. The trade depression of that year, however, caused the Savannah Steam Ship Co. to abandon their proposal to use the vessel on coastwise service, and it was decided to send her to Europe for sale. She was advertised to sail for Liverpool, with an intermediate call at New York 'should a sufficient number of passengers offer.' None did in fact offer, and so the proposed call at New York was cancelled.

After numerous delays, *Savannah* left her home port on 24 May 1819, bound direct for Liverpool, under the command of her captain, Moses Rogers.[8] She carried no passengers,[9] but stowed 75 tons of coal and 25 cords of wood. The bulk of the fuel to be carried is said to have rendered the vessel unprofitable in service.[10] However, she persevered across the Atlantic, under sail with the occasional use of her paddles, at a mean speed of about 6 knots. On 17 June she was seen off the coast of Ireland, and reported as a ship on fire. Her log-book[11] contains on 18 June the admission: 'No cole to git up steam.'

However, she recoaled at Kinsale and steamed on to Liverpool where she arrived on 20 June. It was recorded[12] that: 'The *Savannah,* a steam vessel, recently arrived at Liverpool from America, the first vessel of the kind which ever crossed the Atlantic, was chased the whole day off the coast of Ireland by the *Kite,* revenue cruiser on the Cork station, which mistook her for a ship on fire.' The crossing from Savannah had taken 27 days 11 hours, in which her paddle-wheels are said to have been used on seven occasions, for a total of about 85 hours, and only when there was so little wind that her speed reduced to 4 knots.

From Liverpool, *Savannah* proceeded to Elsinore, Stockholm, and St. Petersburg (now Leningrad) where it was hoped to sell her to Tsar Alex-

[7] *New York Mercantile Advertiser,* 27 March 1819.

[8] H. C. Bolton, 'The log-book of the *Savannah,*' *Harper's New Monthly Magazine,* February 1877, p. 342.

[9] J. Elfreth Watkins, 'Log of the *Savannah,*' *Report of the United States National Museum* (Washington, 1890).

[10] *Scientific American,* 14 October 1854.

[11] Preserved in the United States National Museum at Washington.

[12] *The Times* (London), 30 June 1819.

ander. It is said that the Tsar made a trip on board to Kronstadt, but he did not purchase. *Savannah* returned to her home port under sail, because of the high cost of coal abroad.[13] No attempt was made to use the engine, except as she entered the river Savannah on 30 November 1819.

She left again on 3 December, and reached Washington in 12 days; but the United States Government did not purchase her. One newspaper[14] merely commented that her engine did not detract from her sailing qualities. In 1820 the vessel was sold at auction. Her engine was purchased by the Allaire Works, of New York, and she became a coastwise sail-packet between Savannah and New York. She ran ashore on Long Island, in a gale of 5 November 1821, and became a total wreck.[15]

Principal dimensions of the P.S. *Savannah* were as follows: Gross register, 320 tons; burden, about 170 tons; length over all, about 110 feet; length between perpendiculars, 98.5 feet; breadth of hull, 25.8 feet; breadth over paddle-wheels, when in use, about 36 feet; depth of hold, 14.2 feet; draft, about 13 feet.

P.S. *Conde de Palmella* (1820)

Now to be disposed of, once and for all, is that historical diehard the P.S. *Conde de Palmella*. This small paddle steamer of 70 tons burden, length 50 feet, and breadth 14 feet, was built at Liverpool for Messrs. A. J. da Costa. She was fitted in September 1820 with low-pressure condensing engines of 20 nominal horsepower, constructed by Messrs. Fawcett and Preston, of Liverpool, which are said to have propelled her at 3 knots in a calm. The vessel sailed from Liverpool in October 1820, under the command of Captain Silva, and arrived in Lisbon four days later. She is stated by several reputable steamship historians[16] to have proceeded thence to Brazil, but this cannot be substantiated.

Correspondence with the Director of the Biblioteca Nacional, at Lisbon, confirms that the *Gazeta de Lisboa* No. 252, of 19 October 1820, contains an entry to the effect that a vessel named *Conde de Palmella* arrived at Lisbon from Liverpool on Sunday, 15 October, with ballast. No evidence can be found in support of her reputed departure for Brazil; and further reference to the Biblioteca de Marinha, at Rio de Janeiro, has also failed to confirm her arrival in South America. In 1836, however, the British

[13] Hunt's *Merchants' Magazine and Commercial Review*, December 1850, p. 693.

[14] *Daily National Intelligencer* (Washington), 18 December 1819.

[15] S. C. Gilfillan, 'The first seagoing auxiliary,' *Yachting*, July 1930, p. 54. David B. Tyler, *Steam conquers the Atlantic* (New York, 1939), p. 14.

[16] Sir G. C. V. Holmes, *Ancient and modern ships*, II—*The era of steam, iron and steel* (London, 1906), p. 14.

Consul at Lisbon reported *Conde de Palmella* in use on the river Tagus;[17] and so it seems evident that the transatlantic claims made on behalf of this British-built river steamboat must be dismissed.

P.S. *Rising Star* (1821)

It would not be strictly accurate, and yet for practical purposes it would be sufficiently near the truth, to say that it was a British steamer which first crossed the Atlantic westwards, from the Old World to the New. This apparent contradiction arises from the fact that when the famous American auxiliary P.S. *Savannah* returned from Europe to her home port in 1819, she did so under sail alone.[13] She did not function as a steamer on that occasion, but carried her collapsible paddle-wheels on deck. So let us dismiss her, with all due respect, from the present discussion.

The first authenticated steamship crossing of the Atlantic from east to west appears to have been that made in 1821-1822 by the first steam warship, P.S. *Rising Star*. This vessel had been ordered in 1818 by Thomas Cochrane (later the tenth Earl of Dundonald) for use as a steam warship in the Chilean revolution; but not until 1820 was she laid down. The wooden hull was carvel-built by Daniel Brent, of Rotherhithe. The vessel had a rather bluff entrance, an extended parallel middle body with flat bottom and three keels, and a short run-in aft. She carried a figurehead above her curved raked stem, and had a plain square transom stern.

The vessel is stated first to have had one and a half, and later two, decks. An old print, published in 1821, represents her as a full-rigged ship with three masts, ten gun-ports on each side, and two funnels placed athwartships between the fore and main-mast. No side paddle-wheels or boxes are shown. The description attached to the picture states that *Rising Star* was built 'under the direction of Lord Cochrane upon the principle of navigating either by sails or by steam, the impelling apparatus being placed in the hold and caused to operate through apertures in the bottom of the vessel.'

To aid her considerable spread of sail, *Rising Star* was fitted with twin-cylinder engines of 70 nominal horsepower,[18] constructed by Messrs. Maudslay, Sons and Field, of Lambeth.[19] Unfortunately, little is now known as to the precise nature of this machinery, but comparison can be made with a smaller but similar vessel, the P.S. *London Engineer,* built in

[17] *Parliamentary Papers,* 1837-38 (78), XLV, 363, p. 30.
[18] Marestier, op. cit., p. 178.
[19] *Parliamentary Papers,* 1822 (417) VI, 199.

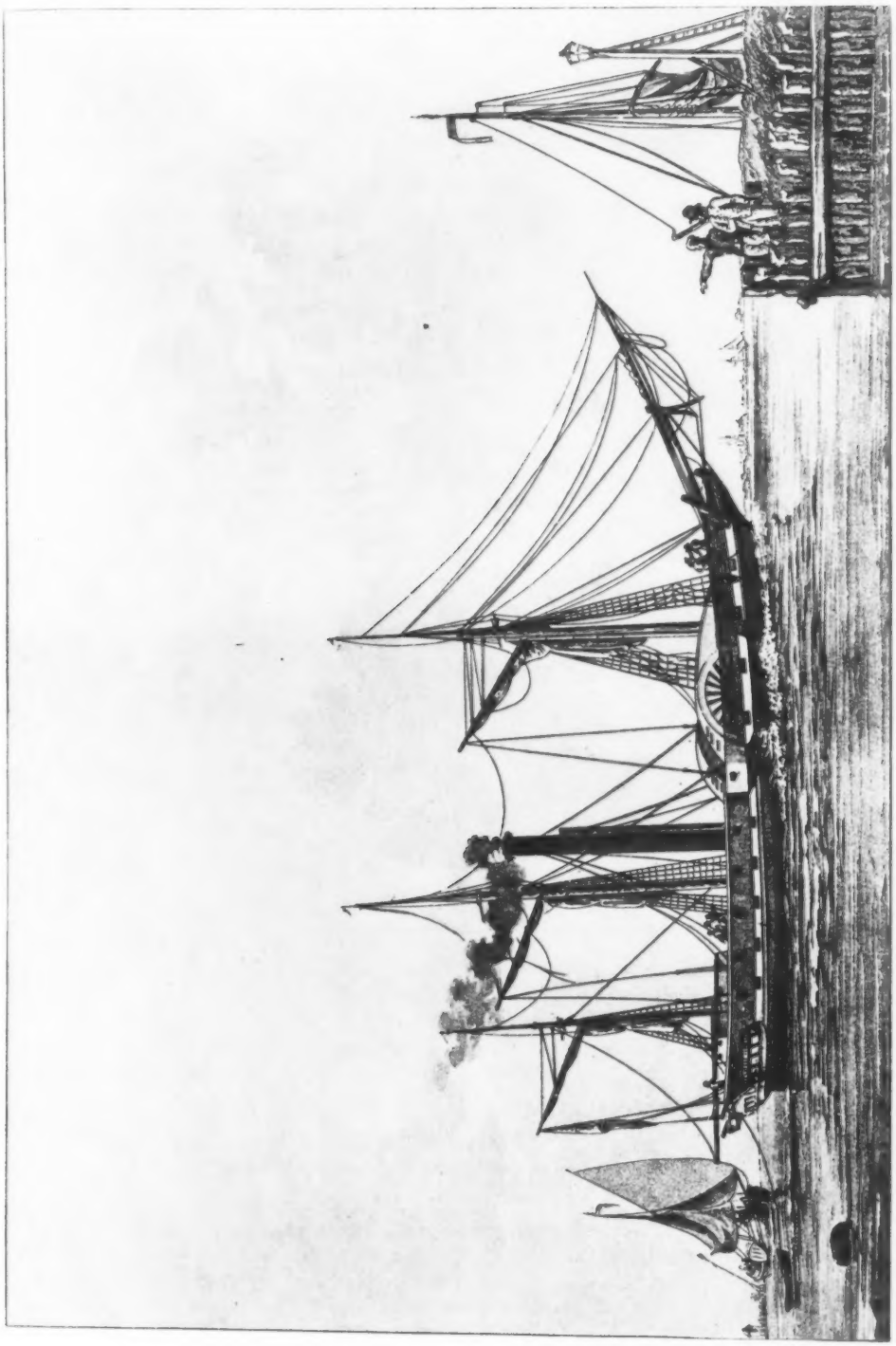
1818 by Daniel Brent and also fitted by Maudslay.[20] From this it would appear that the two vertical cylinders, about 42 inches diameter by 36 inches stroke, were placed athwartships, and each arranged to drive by means of bell-crank side-levers an overhung crank on either end of the paddle shaft. It is probable also that the bell-crank arms were equal, so that the inclined stroke of the connecting-rod was the same as the vertical stroke of the piston.

Steam at a pressure of about 2 to 3 pounds per square inch was supplied by marine flue boilers of the form in common use at that period; it is probable that four such boilers were used, two to each of the funnel uptakes placed athwartships. It is also possible that these boilers were made of copper, as were those of *London Engineer* and the one fitted by Maudslay to the famous P.S. *Enterprise* in 1824. It was believed that copper boilers would stand up to continuous service better than iron, an important consideration where facilities for repair were not available. The boilers were, of course, fed with sea water, and had to be blown out occasionally to avoid salt concentration. At the low pressure used, no feed-pump was necessary; water could be run into the boilers from a raised tank. The funnels were tall and slender, about 2 feet diameter.

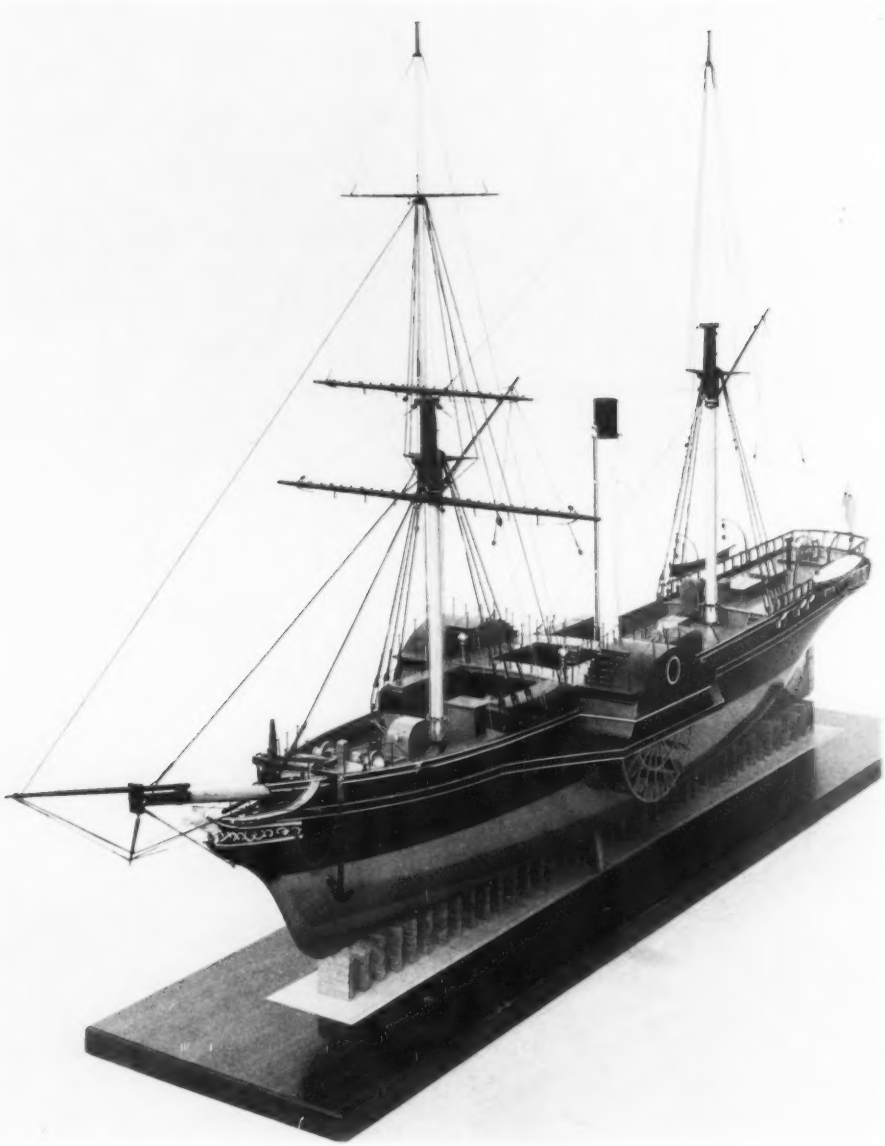
The two paddle-wheels, each about 13.5 feet diameter and 7.5 feet wide, were placed in the hold between the fore and main-mast, on either side of the center keel. The wheels of *London Engineer* had each eight radial floats, and were enclosed in an air-tight casing; this was open to the sea by apertures in the bottom of the vessel, between the center keel and the two outer keels on either side. The paddle floats, about 39 inches wide, projected through these apertures, below the floor level to that of the three keels. As the paddle shaft was only about 15 inches above sea level, two air-pumps were used to force air into the casing and thus lower the water level therein.

Rising Star was floated out of dock on 5 February 1821, and ran her trials in June, when a speed of 5 to 6 knots by steam power was attained on the Thames; the paddle-wheels would have made about 22 revolutions per minute. After many alterations and repairs had been made to her machinery, the vessel sailed from Gravesend on 22 October, bound for Valparaiso. She sprang a leak off the coast of Portugal, and put into Cork for repairs. She eventually arrived at Valparaiso in April 1822. *Rising Star* is said to have proved herself 'a very superior sea-boat' and often to have reached a speed of 12 knots. The extent to which she used steam power on the Atlantic, however, is not recorded.

20 *The Engineer* (London), 24 September 1897, p. 297; 15 October 1897, p. 368.



P.S. *Curaçao* (1825)
Reproduced from an old Dutch print



P.S. *Sirius* (1837)
Model in the Science Museum, London

By the time she arrived in Chile, the first steamer to enter the Pacific, the revolution had succeeded, and the Spanish Navy had departed.[21] *Rising Star* was therefore never used as a warship, for which she had been intended. In 1824 she was sold at Valparaiso to Messrs. Samuel Winter and J. Brittain, of Buenos Aires; and in 1827 she passed into the ownership of Mr. H. Stewart, of Liverpool. The vessel was wrecked in 1830.

Principal dimensions of P.S. *Rising Star* were as follows: Gross register, 428 tons; length between perpendiculars, 123.6 feet; breadth, 27.8 feet; depth of hold, 6.1 feet; draft, about 5.5 feet.

P.S. *Caroline* (1823)

Not until recent years has this pioneer French paddle steamer received due credit, and that in an admirable American publication.[22] The vessel has never been described, or even mentioned, in the standard works of British historians such as Fincham, Lindsay, Kennedy, Holmes, or Fletcher. She was, however, notable as the first steamer in the French Navy,[23] and the second in all history to use steam on the Atlantic from east to west.[24] Her omission from British literature has doubtless been quite inadvertent, and due solely to the fact that the sources of information were not readily available to historians outside France.

Official records preserved in the Archives Centrales de la Marine, at Paris, establish it beyond doubt that this French steamer crossed the South Atlantic in 1824-1825; but let us trace her history from the start. The vessel was built of wood at Rouen, and launched under the name of *Galibi* in 1823 for the merchant service. She was, however, renamed *Caroline* in 1824, on her transfer to the French Navy, which she was the first steam-auxiliary vessel to enter.[25]

Caroline was a two-masted schooner. Her fore and main-mast, when first erected, were of 69 feet and 72 feet respectively; but both of them were shortened 6.5 feet before she crossed the Atlantic. The hull is said to have had no keel;[25] but a false keel 10 inches deep was fitted later for ocean service.

To assist her spread of sail, and to enable the vessel to function as a tug-boat,[23] *Caroline* was fitted with low-pressure side-lever engines of 50

21 Earl of Dundonald, *Narrative of services in the liberation of Chili, Peru, and Brazil from Spanish and Portuguese domination* (London, 1859), I, 204.

22 David B. Tyler, *Steam conquers the Atlantic* (New York, 1939), p. 20.

23 Illustration, *Histoire de la marine* (Paris, 1934), p. 340.

24 The first was the P.S. *Rising Star* in 1821-1822.

25 Bibliothèque Nationale, Paris. Département des Manuscrits, *Nouvelles acquisitions*, France, No. 9483.

nominal horsepower, ordered in December 1822 from Messrs. Manby, Wilson, Henry et Cie., of Charenton, near Paris,[26] and completed in 1824. The two cylinders were 29 inches diameter by 36 inches stroke, and could be disconnected from the paddle shaft at will. This enabled the paddle-wheels to turn freely, with the engines stopped, when the vessel was to proceed under sail alone, or when repairs to the machinery became necessary. The air pumps for the condenser were 19 inches diameter.

Steam at a pressure of about 2 to 3 pounds per square inch was supplied by an iron flue boiler in three sections, each surmounted by a safety-valve. The three boiler sections were connected by two internal flues, fitted with muff-pieces to prevent the escape of smoke into the boiler-room. The paddle-wheels were about 13 feet diameter; each had three sets of radial arms and carried six float boards 76 inches long and 23.5 inches wide.

The vessel, under the name of *Galibi,* ran her trials in July 1824, with the Duchesse de Berry on board. The paddle-wheels made 21 revolutions per minute, and a speed of 7 knots under steam power was attained. It is recorded that the engines ran smoothly and functioned perfectly. After her transfer to the French Navy, *Caroline* sailed from Brest on 14 December 1824 bound for Cayenne. On the Atlantic she encountered headwinds which reduced her speed to 2 knots, and at times even to 1 knot. Off the coast of French Guiana, however, a mean speed of 5 knots was maintained. The date of her arrival at Cayenne is not recorded.

Caroline arrived back in France on 3 August 1827. Her hull and machinery were inspected and found to be in good condition, even though she had been under steam for more than 9000 hours. In 1828 the vessel was renamed *Louise,* and in 1833 she was condemned and broken up.[27]

Principal dimensions of P.S. *Caroline* were as follows: Gross register, about 350 tons; burden, about 190 tons;[23] length between perpendiculars, 121.3 feet; breadth of hull, 23 feet; breadth over paddle boxes, about 39 feet; depth in hold, about 6 feet; draft, with false keel, 5.5 feet. The writer wishes to record here his indebtedness and thanks for the help received from Monsieur le Capitaine de Corvette Vichot, Conservateur du Musée de la Marine, Paris.

P.S. *Curaçao* (1825)

The wooden hull of this paddle steamer was built at Dover by Messrs. J. H. and J. Duke and launched in September 1825 under the name of

[26] Archives Centrales de la Marine, Paris. Service Historique, 7 DD[1], 10.

[27] Archives Centrales de la Marine, Paris. Service Historique, CC[1]-1074, folio 1996.

Calpe. The vessel was intended for trade between Great Britain, America, and the West Indies by the American and Colonial Steam Navigation Co., of London. She never sailed in their service, however, for in October 1826 she was sold to the Dutch, complete with all appurtenances. Renamed by them *Curaçao,* she became the first steamship in the Netherlands Navy.

The hull was carvel-built, to rather full underwater lines, with a bluff entrance, no parallel middle body, and a long run aft. The paddle-wheels were placed well forward, and the upper strakes of the hull were flared out, to increase the deck space and reduce the projection of the sponsons. The vessel carried a scroll head above her round cut-water bow, a feature found only in a few of the earlier steamships and abandoned by about 1850. She had one flush deck, raised about 10 inches at the square stern, which was decorated with mock quarters.

Curaçao was schooner-rigged, with three masts and a standing bowsprit (see Plate 25). She was at first armed with two iron 12-pounder carronades by the Netherlands Navy; but this armament was later increased to five 36-pounders, one pivoted forward of the mizzen-mast, and two 6-pounders. The crew consisted of 42 officers and men.

To assist her spread of sail, *Curaçao* was propelled by side-lever engines of 100 nominal horsepower, constructed by Messrs. Maudslay, Sons and Field, of London. These had two cylinders, 40 inches diameter by 48 inches stroke, and could have developed about 150 indicated horsepower. The condensers maintained a vacuum of 26 to 27 inches. Steam at a pressure of 3 pounds per square inch was supplied by a rectangular iron boiler with four furnaces, which was tested to 6 pounds per square inch pressure. No feed-pump was necessary; water was run into the boiler from a raised tank. Coal was stowed in two iron bunkers on either side of the engine-room and in another bunker aft. The total coal reserve was later increased to about 95 tons by the addition of two timber bunkers, built in above the sides of the boiler.

The paddle shafts were fitted with worm-operated disconnecting cranks of the form introduced by Maudslay. These enabled the paddle-wheels to turn freely, with the engines stopped, when the vessel was to proceed under sail alone, or when repairs to the machinery became necessary. The paddle-wheels were 15 feet rim diameter; each was fitted with 14 fixed radial floats, about 7 feet long and 2 feet wide. The float width was later reduced to 18 inches. The paddle-wheels rotated at 22 revolutions per minute, and the normal speed of the vessel was about 8 knots.

Under the command of First-Lieutenant J. W. Moll, *Curaçao* sailed from Hellevoetsluis, near Rotterdam, on 26 April 1827, bound for Paramaribo with a total of 57 persons on board. The journal of her Atlantic crossing, preserved in the archives of the Dutch Departement der Marine, relates in detail the mechanical difficulties with which the commander had to contend.[28] Often the engines had to be stopped, to replace lost paddle floats; often the fires had to be put out, to clean and repair the leaking boiler, encrusted with salt. As the coal was consumed, at about 5 tons per day under full steam, and the vessel rose, her paddle-wheels were increased, first to 16 feet diameter by additional floats 6 inches wide placed outside the rims, and then further to 17 feet diameter by a redisposition of the main 18-inch floats. Before the eventual return to Hellevoetsluis, some 30 paddle floats had been lost and replaced.

Moll seems, however, to have been mainly concerned with the 'lurching' of the vessel. Her best speed, with favorable winds, was 10 knots. On 23 May the coast of Guiana was sighted; and next afternoon *Curaçao* anchored in Paramaribo. The crossing, of about four thousand sea miles, had taken 28 days at a mean speed of 6 knots, with the intermittent help of her paddle-wheels.

After her return to Hellevoetsluis, *Curaçao* was fitted with bilge keels, which helped to cure the lurching. For her second crossing, she left Holland on 1 March 1828 with 68 on board, and reached Paramaribo in 25 days, for the first 13 of which she maintained continuous steam power. After her third double crossing, in 1829, *Curaçao* was withdrawn from the West Indies service, and remained from 1830 to 1834 stationed on the Schelde. In this period she made a trip to London, and once more in 1839. Then from 1840 she returned for a time on the West Indies station, until decommissioned in 1846. She never sailed again, and in 1850 her hulk was sold to the shipbreakers.

Principal dimensions of the P.S. *Curaçao* were as follows: Gross register, 438 tons; burden, 239 tons; length on deck, from stem to stern-post, 130.5 feet; length between perpendiculars, 127.3 feet; length of keel, 114.7 feet; breadth of hull, 26.9 feet; breadth over paddle boxes, 44.9 feet; depth of hold, 16.5 feet; draft, about 13.5 feet. The writer wishes to record here his indebtedness and thanks for the help received from Miss J. B. van Overeem, Assistant Curator at the 'Prins Hendrik' Maritiem Museum in Rotterdam.

[28] Jan W. van Nouhuys, *De eerste Nederlandsche transatlantische stoomvaart in 1827 van Zr. Ms. stoompakket Curaçao* (The Hague, 1927). "S Konings stoom packet *Curaçao*,' *Marineblad*, Aflev.1, Jaar 1923.

P.S. *Royal William* (1831)

This famous Canadian paddle steamer was built of wood at Quebec by Messrs. Black and Campbell, to the plans of their naval architect and foreman, Mr. James Goudie.[29] The keel was laid in September 1830 at Cape Cove, a mile above the Citadel, near the spot where Wolfe breathed his last. The vessel was named after William IV, and launched on 27 April 1831. Two years later she made history as the first Canadian steamship to cross the Atlantic.

The wooden hull was carvel-built to the lines by Mr. James Goudie, who had learned his profession in Scotland. The vessel had a fine entrance and a short parallel middle body between the paddle boxes. The upper strakes of the hull were flared out, fore and aft, to envelop and protect the paddle-wheels; there were no outboard sponsons. The vessel carried a scroll head above her cut-water bow. She had one flush deck, and her square stern was decorated with mock quarters.

Royal William was schooner-rigged, with three tall masts and a standing bowsprit. She carried three square sails on the fore-mast. The under-deck cabin is said to have been fitted out tastefully, and to have contained some 50 berths. The dining saloon occupied the round house on deck. Accommodation was also provided for about 80 steerage passengers. The crew consisted of 36 men.

After her launch, *Royal William* was towed up the river St. Lawrence to Montreal, to be fitted with side-lever engines of 200 nominal horsepower by Messrs. Bennet and Henderson. The senior partner of this firm, John Bennet,[30] was born in Scotland, and had served his apprenticeship with Messrs. Boulton, Watt and Co. The engines of *Royal William* comprised two cylinders, about 51 inches diameter by 60 inches stroke, which could have developed about 300 indicated horsepower. The crank-shafts were forged by Robert Napier, in his works at Camlachie on the Clyde.[31]

Steam at a pressure of about 4 pounds per square inch was supplied by flat-sided rectangular iron boilers, of the form in common use at that period. The paddle-wheels were 18.5 feet diameter and rotated at about 20 revolutions per minute. Each was fitted with 15 fixed radial floats, 6.25 feet long and 21 inches wide. The normal speed of the vessel would be about 8 knots.

29 Archibald Campbell, 'The *Royal William*, the pioneer of ocean steam navigation,' *Transactions of the Literary and Historical Society of Quebec*, New Series, No. 20, 1891.

30 Article on Mr. John Bennet, *Daily Witness* (Montreal), Saturday, 20 March 1897.

31 Letter from Mr. Geo. Black, *Quebec Morning Chronicle*, 11 January 1884.

Royal William was intended to improve communication between the maritime provinces of Old Canada by the newly-formed Quebec and Halifax Steam Navigation Co., in which Samuel Cunard and his brothers were associated. In 1831 she made three round trips from Quebec to Halifax and intermediate ports. In 1832, however, the vessel had to be quarantined on account of the cholera epidemic, and the Company suffered heavy financial loss. Early in 1833 *Royal William* was sold, and later despatched by her new owners to Boston, where she was enthusiastically received on 17 June as the first British steamer to enter a port of the United States. On her return to Quebec, it was decided to send the vessel to London for sale.

Royal William left Pictou Harbor, Nova Scotia, on 18 August 1833, with seven passengers on board, and heavily laden with 324 tons of coal.[32] She encountered a gale off Newfoundland, which disabled the starboard engine, and the vessel was reported to be sinking. However, the pumps were started, and she ran for ten days on the port engine alone. She persevered across the Atlantic, at a mean speed of about 6 knots, and on 6 September put into Cowes for repairs. She then continued round to the Thames, and eventually reached her destination at Gravesend on 12 September, after 25 days from Pictou. It has been said that most of her crossing was made under steam power, apart, of course, from the intervals necessary to clear the boilers of salt, which in the words[33] of her captain, John McDougall, occupied 'from 24 to 26 hours every fourth day.'

Not until five years later, in April 1838, was the Atlantic crossed under continuous steam power, by the P.S. *Sirius,* of which a model (see Plate 26) is preserved in the national collections at the Science Museum, London. She was the first transatlantic steamer to be fitted with surface condensers, patented by Samuel Hall in 1834, which enabled her boilers to be fed with fresh water and thus kept in constant operation.

Royal William was chartered to the Portuguese Government soon after her arrival in London; and in September 1834 she was sold to the Spanish, and converted into a warship under the name of *Isabella Segunda*. She was the first steamer in the Spanish Navy.[34] In 1840 she was sent to Bordeaux for repairs, but her timbers had become rotten, and she was converted into a hulk.[35] Another vessel of the same name was built at Bordeaux to re-

[32] Robert Ker, 'The pioneer of Atlantic steamships,' *Canadian Magazine,* May 1907, p. 13.

[33] F. C. Wurtële, 'SS. *Royal William*, the pioneer of transatlantic steam navigation,' *Report of the Secretary of State of Canada for 1894* (Ottawa, 1895), p. 60.

[34] Letter from Mr. Alexander Somerville, *Toronto Globe,* 15 May 1876.

[35] Folder entitled *The story of the Royal William,* Royal Bank of Canada (Montreal, 1933).

ceive her engines, but this was wrecked in January 1860 off the coast of Algeria.

Philatelists will be interested to note that in August 1933 the Canadian Post Office issued a special *Royal William* stamp[36] to mark the centenary of her historic Atlantic adventure. The stamp represents the vessel at sea, under full steam, and is of 5-cents face value.

Principal dimensions of the P.S. *Royal William* were as follows: Gross measurement, 1370 tons;[37] burden, 363 tons; length of deck, 176 feet; length between perpendiculars, 160 feet; length of keel, 146 feet; breadth between paddle boxes, 28 feet; breadth over all, 44 feet; depth of hold, 17.75 feet; draft, 14 feet. The writer wishes to record here his indebtedness and thanks for the help received from Mr. E. C. Woodley, President of the Literary and Historical Society of Quebec; from Mr. G. R. Lomer, Librarian of McGill University in Montreal; from the Chicago Historical Society; and from Dr. Antoine Roy, Archivist at the Provincial Museum in Quebec.

P.S. *Rhadamanthus* (1832)

The first steam vessel of the British Navy to cross the Atlantic was *Rhadamanthus,* built of wood by the Admiralty at Devonport, to the plans of Mr. T. Roberts, and launched in April 1832. Four sister-ships were also built about the same time. *Rhadamanthus* was the first steam vessel to be built at Devonport, and was commissioned in October 1832.

She was described at the time as 'beautiful to look at, and as sharp in the bow as the bill of a snipe.' She carried four guns, a complement of 60 officers and men, and was schooner-rigged with three masts and a standing bowsprit. Her paddle-wheels were placed well forward, and were driven by side-lever engines of 220 nominal horsepower, constructed by Messrs. Maudslay, Sons and Field, of London.[38] These had two cylinders 55.5 inches diameter by 5 feet stroke, which developed 385 indicated horsepower on trial. Steam was supplied at a pressure of 3.5 pounds per square inch by iron tubular boilers. The paddle-wheels were 20 feet diameter, each with 12 fixed radial floats, and rotated at 18 revolutions per minute. The normal speed of the vessel was about 8 knots.

[36] William Wood, 'The record-making *Royal William*,' *Canadian Geographical Journal*, August 1933, p. 53.

[37] This is the official Canadian measurement, based on the over-all breadth of the hull, which was flared out to envelop the paddle-wheels as described above. This unusual construction rendered her calculated measurement disproportionate to her burden, as compared with other pioneer Atlantic steamships.

[38] Royal United Service Museum, *Official Catalogue* (London, 1920), p. 278.

Rhadamanthus was used for a time with her sister-ship, the P.S. *Dee* (1832), in a blockade of the Dutch coast, and was then sent to the West Indies. She left Plymouth on 21 April 1833, and steamed across the Bay of Biscay. Her engines were then stopped, and with six floats removed from each paddle-wheel, she continued to Funchal under sail alone. Her coal bunkers were replenished to about 320 tons at Madeira, where she left on 30 April for Barbados. Steam power was used intermittently; the floats of her paddle-wheels were removed and replaced as required. Barbados was reached on 17 May;[39] the distance of 2500 miles was covered at a mean speed of 6.1 knots.

Rhadamanthus was later used at Port Royal, Jamaica, to make a survey and to place buoys. She left there on 11 February 1834, and arrived back in Plymouth on 3 April. In 1849 her captain, W. H. Henderson, pronounced her 'an excellent sea boat, and a very serviceable vessel.' In 1860 her boilers were fitted with superheaters. The vessel was broken up at Sheerness in 1864.

Principal dimensions of *Rhadamanthus* were as follows: Old measurement, 813 tons; length over all, about 205 feet; length between perpendiculars, 179.4 feet; length of keel, 143.2 feet; breadth of hull, about 27.5 feet; breadth over paddle boxes, 46 feet; depth of hold, 17.8 feet; draft, 14.5 feet.

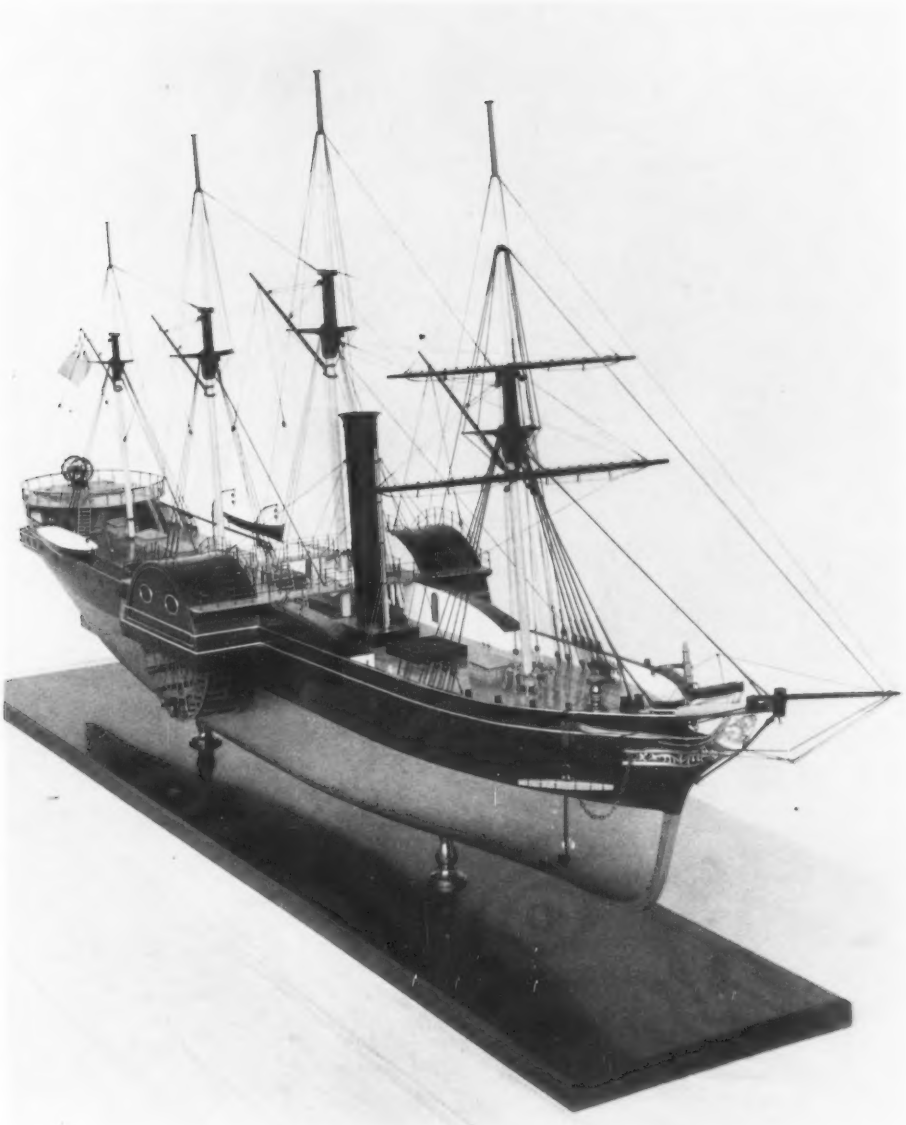
P.S. *Sirius* (1837)

The first vessel to cross the Atlantic under continuous steam power was *Sirius*. She was built of wood in 1837 by Messrs. Robert Menzies and Son, at Leith, for the service between London and Cork of the St. George Steam Packet Co., which eventually became the City of Cork Steam Packet Co. Although never intended for the Atlantic service, this little cross-channel steamer was chartered by the newly-formed British and American Steam Navigation Co.,[40] whose own vessel, the P.S. *British Queen*, was not completed in time, and despatched from Cork Harbor to New York in April 1838.

Sirius was a two-masted vessel. Three square sails were carried on the fore-mast, while the main-mast was rigged fore and aft (see Plate 26). The figurehead consisted of a dog, holding between its front paws the Dog

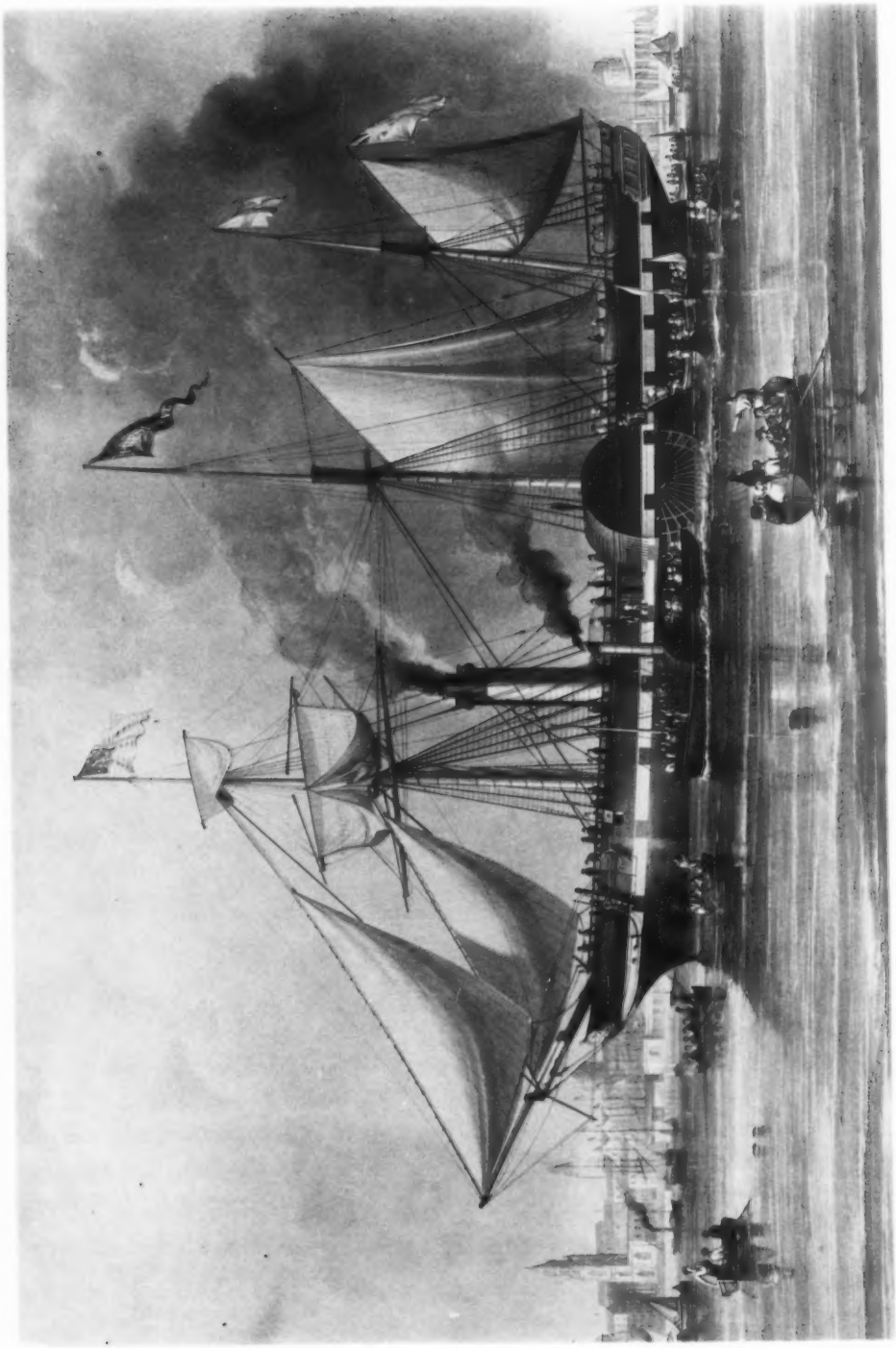
[39] Geo. H. Preble, *Chronological history of the origin and development of steam navigation* (Philadelphia, 1883), p. 123.

[40] Joshua Field, *Glances at Atlantic steam navigation, 1838-41* (manuscript in the Science Museum Library, London), p. 1.



P.S. *Great Western* (1837)
Model in the Science Museum, London

PLATE 28



P.S. *President* (1839)

Reproduced from a print in the New York Public Library

Star, *Sirius*, after which the vessel was named.[41] The crew consisted of 35 officers and men.

The vessel was propelled by side-lever engines of 320 nominal horsepower, constructed by Messrs. Thomas Wingate and Co., of Whiteinch near Glasgow, with two cylinders 60 inches diameter by 6 feet stroke. She was the first steamer on the Atlantic to be fitted with surface condensers, patented by Samuel Hall in 1834, which enabled her boilers to be fed with fresh water. Steam at a pressure of 5 pounds per square inch was supplied by rectangular flue boilers, which consumed about 24 tons of coal per day. The paddle-wheels were 24 feet diameter, each with 12 fixed radial floats about 8.5 feet long, and made 15 revolutions per minute for a speed of about 9 knots.

Under the command of Lieutenant R. Roberts, R.N., *Sirius* left London for Cork Harbor, where she coaled, leaving there on 4 April 1838 with 40 passengers for New York. She encountered strong head-winds, and some of the crew protested, declaring that it was madness to proceed in so small a vessel. However, thanks to the determination and discipline of the commander, *Sirius* arrived safely off New York on 22 April, after an Atlantic crossing of 18 days 10 hours at a mean speed of 6.7 knots. She was closely followed by the P.S. *Great Western*, which arrived the next day.

The arrival of *Sirius* in New York was an occasion of great enthusiasm, reported as follows in one of the local newspapers:[42] 'Nothing is talked of in New York but about this *Sirius*. She is the first steam vessel that has arrived here from England, and a glorious boat she is. Every merchant in New York went on board her yesterday. Lt. Roberts, R.N., is the first man that ever navigated a steamship from Europe to America.' *Sirius* left New York for her return crossing on 1 May; at her departure thousands of people assembled on the wharfs, and the Battery saluted with 17 guns, a mark of respect seldom or never before shown to any merchant vessel. She arrived at Falmouth on 18 May, and proceeded to London the same day. A second double crossing of the Atlantic was completed in July 1838, after which the vessel was used for home and continental services. On one of these trips, between Glasgow and Cork in January 1847, she ran onto a reef of rocks in Ballycotton Bay and became a total wreck.[43]

Principal dimensions of the P.S. *Sirius* were as follows: Gross register, 703 tons; burden, 412 tons; length over all, 208 feet; length between per-

[41] William J. Barry, 'History of the *Sirius*,' *Journal of the Cork Historical and Archæological Society*, October-December 1905, p. 159.

[42] *New York Herald*, 24 April 1838.

[43] Thomas Sheppard, 'The *Sirius*, the first steamer to cross the Atlantic,' *Mariner's Mirror*, January 1937, p. 90.

P.S. *President* (1839)
Reproduced from a print in the New York Public Library

pendiculars, 178.4 feet; length of keel, 170 feet; breadth of hull, 25.8 feet; breadth over paddle boxes, 47.25 feet; depth of hold, 18.3 feet; draft, 15 feet. It has been said that some are born great, and some have greatness thrust upon them; if ever a vessel of modest build had greatness thrust upon her, it was surely the little cross-channel steamer *Sirius*.

P.S. *Great Western* (1837)

On the other hand, *Great Western* was born great in the nautical sense, for she was the first steamer constructed specially for the Atlantic Ferry service (see Plate 27). She was built of wood at Bristol by Mr. William Patterson, to the plans of Mr. I. K. Brunel, F.R.S., and launched on 19 July 1837 for the Great Western Steamship Co. Her first crossing of the Atlantic was accomplished in April 1838, and fully demonstrated the practicability of ocean steamship transport.

To enable the vessel to resist the action of the heavy Atlantic waves, she was constructed with great longitudinal strength. The ribs were of oak, and of scantling equal to that of contemporary line-of-battle ships. They were dowelled and bolted in pairs; there were also four staggered rows of iron bolts, 1.5 inches diameter and 24 feet long, which ran longitudinally throughout the bottom frames of the ship. She was closely trussed with iron and wooden diagonals and shelf-pieces which, with the whole of her upper works, were fastened with bolts and nuts to a much greater extent than had formerly been the practice. The hull was sheathed with copper below the waterline.

The saloon, which was the principal apartment in the ship, was 75 feet long, 21 feet wide, and 9 feet high, and is stated to have been the largest and most luxurious room provided in any vessel of the period.[44] There was accommodation for 120 first-class passengers and 20 second-class but, if necessary, berths for a further 100 could be provided. The crew consisted of 60 officers and men, so that a total of 300 persons could be accommodated.

The vessel was propelled by side-lever engines of 450 nominal horsepower, constructed by Messrs. Maudslay, Sons and Field, and fitted in London. There were two cylinders, 73.5 inches diameter by 7 feet stroke, which indicated 750 total horsepower. Steam at a pressure of 5 pounds per square inch was supplied by four iron return-flue boilers, 11.5 feet long, 9.5 feet wide, and 16.75 feet high, each with three furnaces. The total heating surface was 3840 square feet, and the grate area 202 square feet. These boilers were, however, replaced in 1844 by tubular boilers. The

[44] Joshua Field, op. cit., p. 6.

bunkers provided for 800 tons of coal, but normally not more than 600 tons were carried. The fuel consumption was about 30 tons per day. The paddle-wheels, which were of the cycloidal form introduced by Joshua Field in 1833, were 28.75 feet diameter with fixed floats 10 feet long, and made 15 revolutions per minute.

Great Western was to have sailed from Bristol on 7 April 1838, but the weather proved unfavorable, and it was not until the eighth that she left the mouth of the river Avon.[45] She arrived in New York Harbor early on 23 April, only a few hours after the P.S. *Sirius*. The time occupied was 15 days 5 hours, at a mean speed of 8.8 knots.

Great Western left New York for her return trip on 7 May and arrived at Bristol on the twenty-second. She continued to ply between those ports until 1846, and crossed the North Atlantic 64 times in all. In 1847 she was sold to the Royal Mail Steam Packet Co., and ran for ten years[46] in their service between Southampton and the West Indies. The vessel was broken up at Vauxhall in 1857.

Principal dimensions of the P.S. *Great Western* were as follows: Gross register, 1320 tons; net, 680 tons; length over all, 236 feet; length between perpendiculars, 212 feet; length of keel, 205 feet; moulded breadth, 34 feet; extreme breadth, 35.3 feet; breadth over paddle boxes, 58.3 feet; depth of hold, 23.2 feet; mean draft, 16.7 feet.

P.S. *Royal William* (1837)

Not to be confused with the famous Canadian vessel already described, this second paddle steamer of the name was built of wood in 1837 by Messrs. William and Thomas Wilson, of Liverpool, for the Irish cross-channel service run by the City of Dublin Steam Packet Co. In 1838 she was chartered by the newly-formed Transatlantic Steamship Co., and despatched to New York, the smallest vessel that ever steamed the whole distance from Europe to America.

This second *Royal William* was constructed of oak and elm with pine planking; all her timbers were treated with corrosive sublimate, to retard their decay. The hull is stated to have been fitted with four transverse water-tight bulkheads of wrought iron. She carried two masts, and was rigged as a barkentine. Below deck she had 'capacious accommodation' for 80 passengers.

The vessel was propelled by side-lever engines of 270 nominal horse-power, constructed by Messrs. Fawcett and Preston, of Liverpool, with

[45] Port of Bristol Authority, *Short history of the S.S. Great Western* (Bristol, 1938), p. 21.
[46] Grahame E. Farr, 'The *Great Western*,' *Mariner's Mirror*, April 1938, p. 151.

two cylinders 48.5 inches diameter by 66 inches stroke, which developed 400 indicated horsepower. Steam was supplied at 5 pounds per square inch pressure. The boilers were fired with compressed peat,[47] in addition to coal. The bunkers carried 75 tons of coal, while 365 tons could be stowed in the hold. The paddle-wheels were 24 feet diameter, with fixed radial floats 7 feet long, and rotated at 16.5 revolutions per minute. The normal speed of the vessel was about 11 knots, and the fuel consumption 6.25 pounds coal per indicated horsepower per hour.

Royal William was the first steamship to cross the Atlantic from Liverpool, where she left on 5 July 1838, with 32 passengers on board. She arrived at New York on the twenty-fourth in 18 days 23 hours[48] at a mean speed of 7.3 knots. In all, she made three round trips to New York; then in 1839 she returned to her proper service with the City of Dublin Steam Packet Co. She was later converted into a coal-hulk, and was finally broken up in 1888.

Principal dimensions of the P.S. *Royal William* (1837) were as follows: Gross register, 617 tons; steamboat measurement, 403 tons; length over all, about 200 feet; length between perpendiculars, 175 feet; breadth of hull, 27 feet; breadth over paddle boxes, about 45 feet; depth of hold, 17.5 feet; draft, 11 feet.

P.S. *Liverpool* (1837)

The first two-funnel steamer made her appearance on the Atlantic Ferry service in 1838. She was built of wood by Messrs. Humble and Milcrest, of Liverpool, and launched on 14 October 1837 for Sir John Tobin.[49] Before her completion, however, the vessel was purchased by the newly-formed Transatlantic Steamship Co. for their service between Liverpool and New York.

Liverpool was built of oak and elm, with pine planking, and all the hull timbers were fastened with copper bolts. The frames were trussed with flat iron bar diagonals, placed 8 feet apart. Two transverse wrought-iron beams were fitted over each boiler-room, and one over the engine-room. The paddle boxes were cross-braced with iron rods 2.25 inches diameter. The vessel carried three masts, and all her fixed rigging was made of copper wire rope. The main saloon was 58 feet long; there was also another of 45 feet placed forward. The cabins, most of them double, were fitted with 98 berths.

[47] *Mechanics' Magazine*, 6 October 1838, p. 16.
[48] Joshua Field, op. cit., p. 18.
[49] Joshua Field, op. cit., p. 23.

The vessel was propelled by side-lever engines of 468 nominal horsepower, constructed by Messrs. Forrester and Co., of Liverpool, with two cylinders 75 inches diameter by 7 feet stroke. Steam at 5 pounds per square inch pressure was supplied by four rectangular boilers, two placed forward of the engine-room and two abaft. The paddle-wheels were 28.5 feet diameter, with fixed radial floats about 9 feet long, and made about 15 revolutions per minute.

Liverpool made her first departure from that port on 20 October 1838 with about 60 passengers, but was forced back into Cork by a violent gale. She left there on 6 November and reached New York safely on the twenty-third, in 16 days 17 hours at a mean speed of 7.9 knots; the coal consumption was 465 tons. In July 1840 the Transatlantic Steamship Co. was wound up; and the vessel was sold, with others, to the Peninsular and Oriental Steam Navigation Co. Ltd. She was increased to 1540 tons and renamed *Great Liverpool*. She then plied for some time between Southampton, Falmouth, and Alexandria, and was wrecked in February 1846 on a reef near Cape Finisterre.

Principal dimensions of the P.S. *Liverpool* were as follows: Gross register, 1150 tons; steamboat measurement, 560 tons; length over all, 240 feet; length between perpendiculars, 223 feet; breadth of hull, 30.8 feet; breadth over paddle boxes, 56 feet; depth of hold, 21 feet.

P.S. *British Queen* (1838)

Said to have been the most beautiful steamship of her time,[50] *British Queen* was built of wood by Messrs. Curling and Young, of Limehouse, and launched on 24 May 1838, for the newly-formed British and American Steam Navigation Co. *British Queen* was intended to have opened their service between London and New York in April 1838; but she was not completed in time, however, and the P.S. *Sirius* was therefore chartered by the Company in her stead.

At the time of her launch, *British Queen* was the largest vessel afloat, and was considered to be the finest achievement of London shipbuilding. Her wooden hull was of very solid construction, braced with iron bolts, and was sheathed with copper to 17 feet above the keel. She was bark-rigged, with three masts; her figurehead consisted of a representation of Queen Victoria, beautifully carved and painted white. Accommodation was provided for 207 passengers. The dining saloon was 60 feet long and 30 feet wide; there were 104 berths fitted aft, and 103 forward.

[50] Joshua Field, op. cit., p. 30.

The vessel was propelled by side-lever engines of 500 nominal horsepower, with two cylinders 77.5 inches diameter by 7 feet stroke. These were to have been constructed by Messrs. Claude Girdwood and Co., on the Clyde, but this firm became bankrupt and the contract was transferred to Robert Napier. Steam was supplied at 5 pounds per square inch pressure. The vessel was fitted with a surface condenser, as patented by Samuel Hall in 1834, which enabled her boilers to be fed with pure water. The paddle-wheels were 30 feet diameter, with Galloway floats 9.5 feet long, and made about 15 revolutions per minute. The speed of the vessel was 10.2 knots.

British Queen sailed from London on 10 July 1839, and left Portsmouth for her first Atlantic crossing on the twelfth. She carried more than 600 tons of coal, and arrived at New York on the twenty-seventh; her mean speed on this occasion was 8.4 knots. In all, she crossed nine times to New York in the service of the British and American Steam Navigation Co. In 1841 she was sold to the Belgian Government, for whom she crossed three times from Antwerp to New York, with an intermediate stop at Cowes. She was broken up in 1842.

Principal dimensions of the P.S. *British Queen* were as follows: Gross register, 1862 tons; burden, 1053 tons; length over all, 275 feet; length between perpendiculars, 245 feet; length of keel, 223 feet; breadth of hull, 40.5 feet; breadth over paddle boxes, 64 feet; depth of hold, 27 feet; draft, 17 feet.

P.S. *Unicorn* (1836)

The first vessel owned by the Cunard Line was built of wood in 1836 by Messrs. Robert Steele and Son, at Greenock, for the service run by Messrs. G. and J. Burns between Glasgow and Liverpool. She was, however, purchased in 1840 by the newly-formed British and North American Royal Mail Steam Packet Co., which afterwards became the Cunard Steamship Co., and sent out to Canada to run between Quebec, Pictou, and Halifax, in connection with the transatlantic mail service established by the P.S. *Britannia* and her three sister-ships.

Unicorn was carvel-built as a three-masted schooner with standing bowsprit. She had one deck and poop, carried a unicorn head at the bow, and her square stern was decorated with mock quarters. The vessel was propelled by side-lever engines of 260 nominal horsepower, constructed by Robert Napier, at Camlachie. These had two cylinders, about 57 inches diameter by 66 inches stroke, which are said to have developed as much

as 560 indicated horsepower. Steam at a pressure of 5 pounds per square inch was supplied by iron flue boilers, fed with fresh water. It is probable that the paddle-wheels were about 22 feet diameter, and made about 18 revolutions per minute for a speed of 8 knots.

Unicorn left Liverpool on 16 May 1840, under the command of Captain Douglas, with 27 passengers on board. She reached Halifax on the thirtieth, after 14 days in tempestuous weather,[51] at a mean speed of about 8 knots. With 24 passengers (which included Mr. Edward Cunard), the vessel then proceeded to Boston, where a vociferous reception awaited her arrival on 2 June.[52] She is said to have proved herself a 'staunch boat' whose machinery worked well.

Unicorn was used by the Cunard Co. to maintain communication between Quebec, Pictou, and Halifax; and while on this service in November 1843, she rescued the survivors of the British sail transport *Premier* wrecked in the mouth of the St. Lawrence. In 1846 the vessel was sold, and later sent round to California, where she operated in the Panama and San Francisco trade until about 1853. She then crossed the Pacific to Australia, whence she is said to have eventually returned to Great Britain.

Principal dimensions of the P.S. *Unicorn* were as follows: Gross register, 648 tons; burden, 390 tons; length over all, about 185 feet; length between perpendiculars, 162.9 feet; breadth of hull, 23.5 feet; breadth over paddle boxes, about 40 feet; depth of hold, 17.3 feet.

P.S. *President* (1839)

This ill-fated paddle steamer, the first to be lost on the Atlantic, was built of wood by Messrs. Curling and Young, at Limehouse, and launched on 7 December 1839, for the service between London and New York of the British and American Steam Navigation Co. She was shorter but rather broader than the P.S. *British Queen,* launched by the same builders in the previous year.

President was constructed with three decks, the upper of which was flush from stem to stern. Her timbers were of oak with fir planking. The transverse frames were solid to the bilge, and were braced fore and aft with iron diagonals. The paddle boxes rose but little above her deck; and the hull was painted with gun-ports, like a frigate. She was schooner-rigged, with three masts, and is said to have presented a very handsome appearance (see Plate 28). Her accommodation was similar to that of *Brit-*

[51] Joshua Field, op. cit., p. 47.
[52] Preble, op. cit., p. 291.

ish Queen. The principal saloon was 87 feet long and 41 feet wide in one part. The crew consisted of 80 officers and men.

The vessel was propelled by side-lever engines of 540 nominal horsepower, constructed by Messrs. Fawcett and Preston, of Liverpool, with two cylinders 80 inches diameter by 7.5 feet stroke. These were stated to have been of sound workmanship, but totally inadequate in power for a vessel of her size; and to this cause her subsequent misfortunes were mainly attributed. Steam at 5 pounds per square inch pressure was supplied by rectangular flue boilers. The paddle-wheels were 31 feet diameter,[53] with Galloway floats 9.25 feet long, and made about 15 revolutions per minute.

President sailed from Liverpool on 1 August 1840, and arrived at New York on the seventeenth, in 16.5 days at a mean speed of 8.4 knots. For her second return trip she left New York on 11 March 1841, under the command of Lieutenant R. Roberts, R.N. (formerly of *Sirius*), and was lost in a severe Atlantic gale with 136 persons on board.

Principal dimensions of the P.S. *President* were as follows: Gross register, 2360 tons; burden, about 1350 tons; length over all, 268 feet; length between perpendiculars, 243 feet; length of keel, 220 feet; breadth of hull, 41 feet; breadth over paddle boxes, 64 feet; depth from spar deck, 32.75 feet; draft, 17.8 feet.

P.S. *Britannia* (1840)

The pioneer or experimental phase of transatlantic steam navigation can be said to have reached finality in 1840, when Mr. Samuel Cunard established a monthly mail steamship service from Liverpool to Halifax and Boston, subsidized by the British Government. *Britannia* was the first vessel built for the British and North American Royal Mail Steam Packet Co., which later became known as the Cunard Steamship Co. Ltd. She was constructed of wood by Messrs. Robert Duncan and Co., at Greenock, and launched on 5 February 1840. Her three sister-ships, *Acadia, Caledonia,* and *Columbia,* were also built on the Clyde about the same time. *Britannia* was the first steamer built to carry the mails between Great Britain and America.

She was a three-masted bark, with two decks, a square stern and clipper bow. On the upper deck, provision was made for the officers' quarters. The total crew consisted of 89 officers and men. There was also a shelter for cows, which were carried in order to ensure supplies of fresh milk.

[53] Joshua Field, op. cit., p. 43.

The passenger accommodation consisted of the dining saloon, and cabins for 115 on the main deck below.[54] This accommodation was described as luxurious; but Charles Dickens, who crossed in *Britannia* in 1842, placed on record in his *American Notes* a rather depressing account. 'Before descending into the bowels of the ship,' he wrote, 'we had passed from the deck into a long and narrow apartment, not unlike a gigantic hearse with windows in the sides; having at the upper end a melancholy stove, at which three or four chilly stewards were warming their hands; while on either side, extending down its whole dreary length, was a long, long table; over which a rack, fixed to the low roof, and stuck full of drinking-glasses and cruet-stands, hinted dismally at rolling seas and heavy weather.'

The vessel was propelled by side-lever engines of 440 nominal horsepower, constructed by Robert Napier, with two cylinders, 72 inches diameter by 82 inches stroke, which indicated 740 total horsepower. Steam at a pressure of 9 pounds per square inch was supplied by four return-flue boilers, each with three furnaces. The total heating surface was 2698 square feet, the grate area 222 square feet, and the coal consumption between 31 and 38 tons per day. The paddle-wheels were 28 feet diameter[55] with 21 fixed radial floats 8.75 feet long, and made 16 revolutions per minute. The normal speed of the vessel was about 8.5 knots.

Britannia left Liverpool for her first crossing of the Atlantic on 4 July 1840. A contemporary newspaper account states that 'the fine vessel is so large that it was necessary to swing her out into mid-stream (the Mersey) and place her passengers aboard from a tender owing to her immense size.' She arrived at Halifax in 11 days 4 hours, at a mean speed of 10 knots, and completed her run to Boston in 14 days 8 hours. The return crossing was made in a little over ten days; the best steaming was 280 miles in one day.

In the winter of 1844, when the harbor of Boston was frozen over, *Britannia* was imprisoned in the ice, and it is recorded that the citizens at their own expense cut a passage, seven miles long and 100 feet wide, to enable the vessel to reach clear water. *Britannia* completed 40 crossings of the Atlantic. In 1849 she was sold to the German Government for the purpose of conversion into a warship. Her engines were later removed, and she existed in Germany for several years as a hulk. It is stated that she was finally broken up at Port Glasgow by the son of her builder.

[54] Cunard Steamship Co. Ltd., *The Cunard Line* (London, 1894), p. 13.

[55] Joshua Field, op. cit., p. 48.

Principal dimensions of the P.S. *Britannia* were as follows: Gross register, 1156 tons; net, 619 tons; displacement at mean draft, 2050 tons; length over all, 228 feet; length between perpendiculars, 207 feet; breadth, 34.3 feet; breadth over paddle boxes, 56 feet; depth of hold, 22.5 feet; mean draft, 16.8 feet.

On the solid foundation thus laid by Samuel Cunard has been built the tradition of the present Cunard White Star Ltd. While such modern leviathans as *Queen Mary* and *Queen Elizabeth* have proved more economical in service than their smaller predecessors, one hesitates to speculate as to whether the ultimate limits in size or speed have yet been attained. In view of the enormous developments in the last hundred years, it would indeed be rash to venture upon any prophecies at all. In the *Edinburgh Philosophical Journal* for January 1820, we read: 'It seems probable . . . that for general purposes, steam will not be found applicable as a power for propelling ships across extensive seas.' Another prophecy, written in 1934, stated that 'it is improbable that the Atlantic steam ferry will be supplanted by an air ferry.' Subsequent developments in the latter direction have already caused us to reconsider the possibilities; but we may be sure that the great Atlantic Ferry will continue, whether on sea or in the air, or by a combination of both, to maintain commerce and friendship between the peoples of the Old World and the New.

U. S. Light-Vessel No. 50 Columbia River

BY WILLIAM A. BAKER

THE comparatively simple outline of the Pacific Coast of the United States with few islands or extensive indentations contrasts sharply with the Atlantic and Gulf coasts and has resulted in fewer aids to navigation, proportional to length, than on the other coastlines. But until the advent of radio direction finding, the general un-pacific character of the weather limited the effectiveness of such lights and fog signals as were established. The winter gales sweeping down from the Aleutians and the dense summer fogs took heavy toll of coastal shipping particularly near ports having communication with the interior such as the Columbia River and San Francisco Bay. There is no record of any lighthouses during the periods of Spanish and Mexican rule.

The importance of the Columbia River to shipping was shown by the first Congressional action in 1848 for aids to navigation on the Pacific Coast. The sum of $15,000 was appropriated for lighthouses at Cape Disappointment at the mouth of the river and at New Dungeness on Puget Sound and for buoying the river from its mouth to Astoria. Due to the remoteness of the region and the difficulties of transportation the sum provided was inadequate and nothing was accomplished. In 1850 a more liberal appropriation of $143,000 was provided for nine lighthouses, a fog signal, and some buoys on the Oregon and California coasts but it was 1854 before the first of these was in operation on Alcatraz Island in San Francisco Bay.[1] Strangely enough, it appears that no primary lighthouse was established at the mouth of the Columbia until 1898 when the North Head Light on Cape Disappointment, a brick tower sixty-five feet high placing the light one hundred ninety-four feet above the sea, was built.[2]

The Columbia River bar, usually a mass of breakers and foam, long prevented the discovery of the river by early explorers who had heard tales

[1] G. R. Putnam, *Lighthouses and Lightships of the United States* (Cambridge, 1933), p. 121.
[2] G. R. Putnam, *Sentinel of the Coasts* (New York, 1937), p. 359.

of a great river leading to the interior. Captain Mears sailing south along the coast named Cape Disappointment on the north side of the river when he turned back after a fruitless search for a passage, and it remained for Captain Gray to brave the surf and name the river after his ship. There are records of ships standing offshore for as long as four weeks waiting for a chance to cross the bar. In 1853 the Lighthouse Service suffered considerable loss when the barque *Oriole* was lost on the bar after waiting for eight days to enter; she had on board the construction materials for five lighthouses.[3]

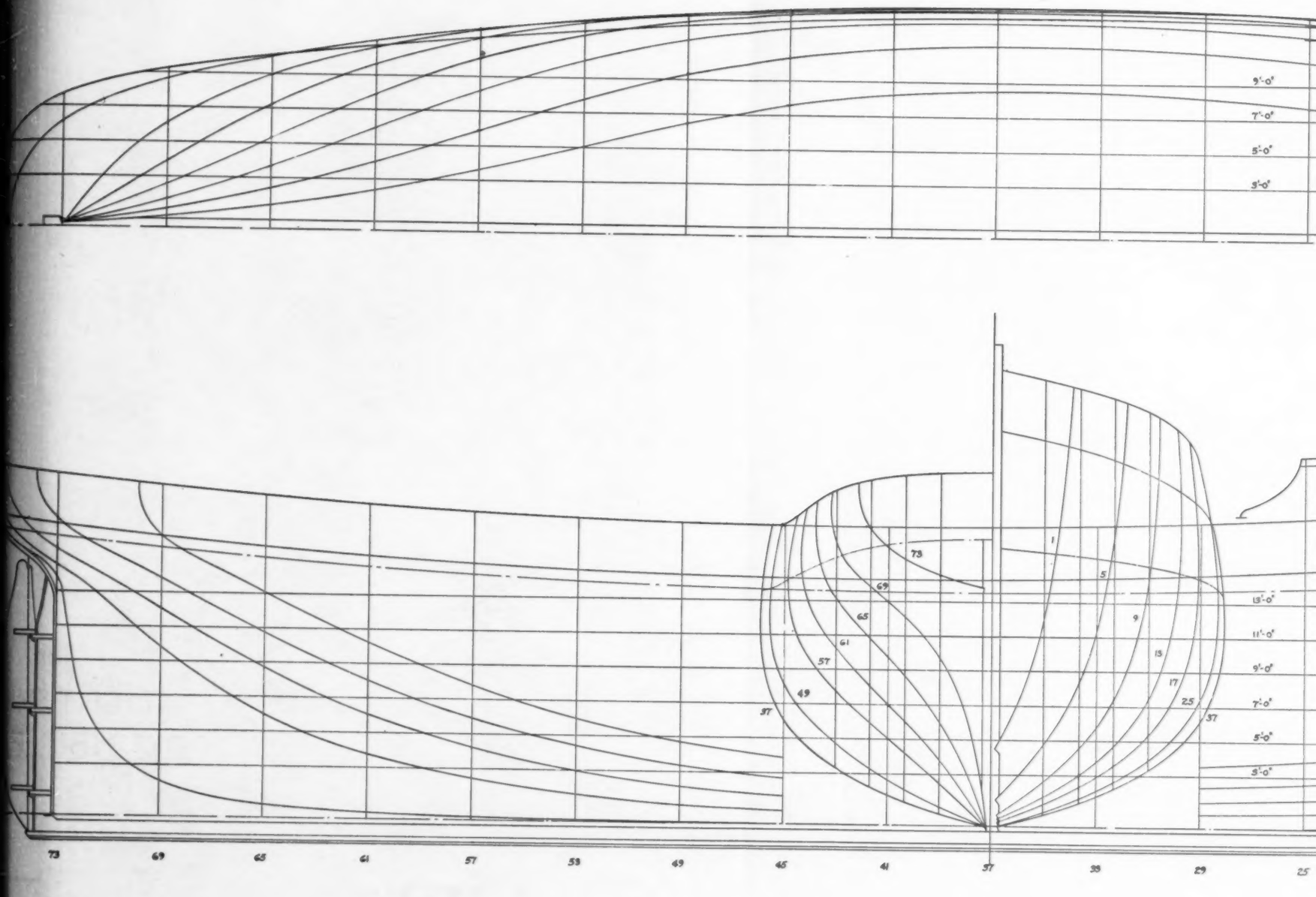
In 1892 the first light-vessel on the Pacific Coast was moored in thirty-five fathoms of water three miles off the entrance to the Columbia River. This lightship, No. 50, was built in San Francisco and was sail propelled. In a heavy gale in November 1899 she, too, suffered the fate of many another vessel, going ashore on Cape Disappointment after parting her moorings. Fortunately, she was not badly damaged but after fruitless efforts for sixteen months to get her off into the sea she was hauled seven hundred yards across the land through the woods and relaunched into the Columbia River. After repairs No. 50 returned to her station and remained in service until 1909.[4] During her service she often furnished refuge to shipwrecked crews who found it easier to reach the lightship than to cross the bar.

A search of the files of the old Union Iron Works of San Francisco, now the San Francisco Yard of the Bethlehem Steel Company's Shipbuilding Division, produced the original lines and arrangement plans for U. S. Light-Vessel No. 50 *Columbia River* built in 1891-1892 from which the accompanying plans were drawn. Unfortunately for marine archeologists, most of the detail plans have disappeared, doubtless at some general housecleaning to provide storage room for plans of then current jobs. There is always the possibility that some of the missing plans may turn up in the more than 2000 tubes of plans comprising the files. Chances are, however, that there were not too many detail plans drawn as the shipyard craftsmen of that era were experts in their fields and needed but general directions—a far cry from the present when nearly every nut and bolt must be detailed.

In redrawing the plans, which was necessitated by the faded condition of the originals, it was found that some items did not check on plan and profile views; such details are shown in what seemed to be the proper position. Other details which checked for location in both views were in-

[3] G. R. Putnam, *Lighthouses and Lightships*, p. 122.

[4] G. R. Putnam, *Lighthouses and Lightships*, pp. 142-143.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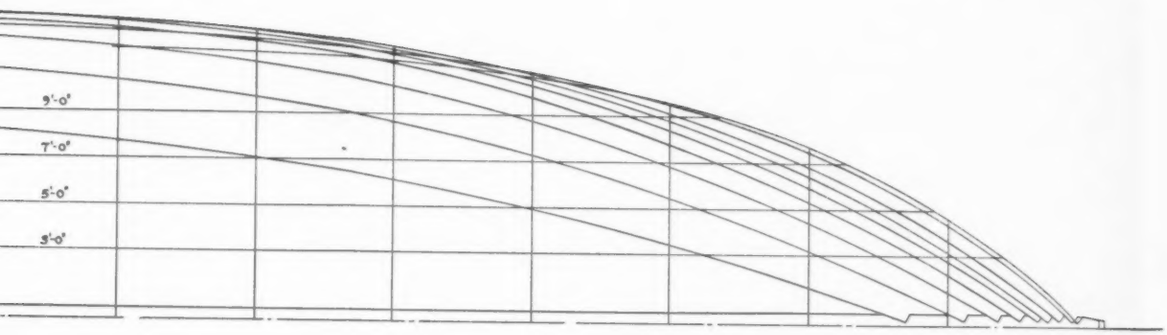
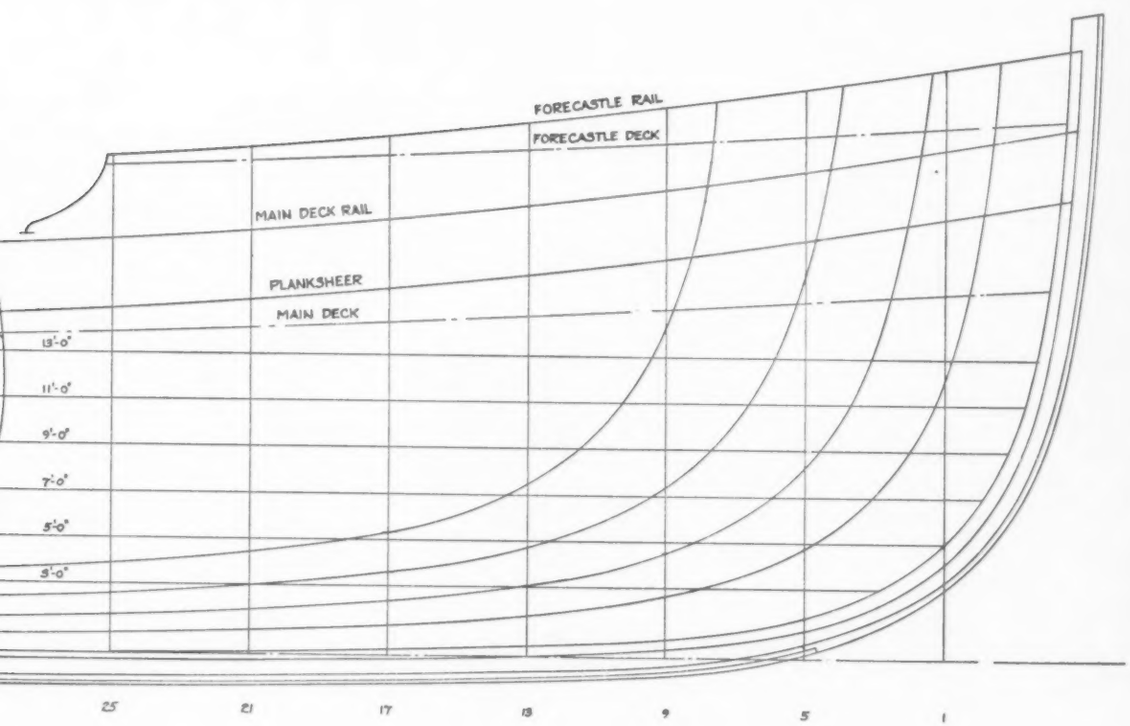


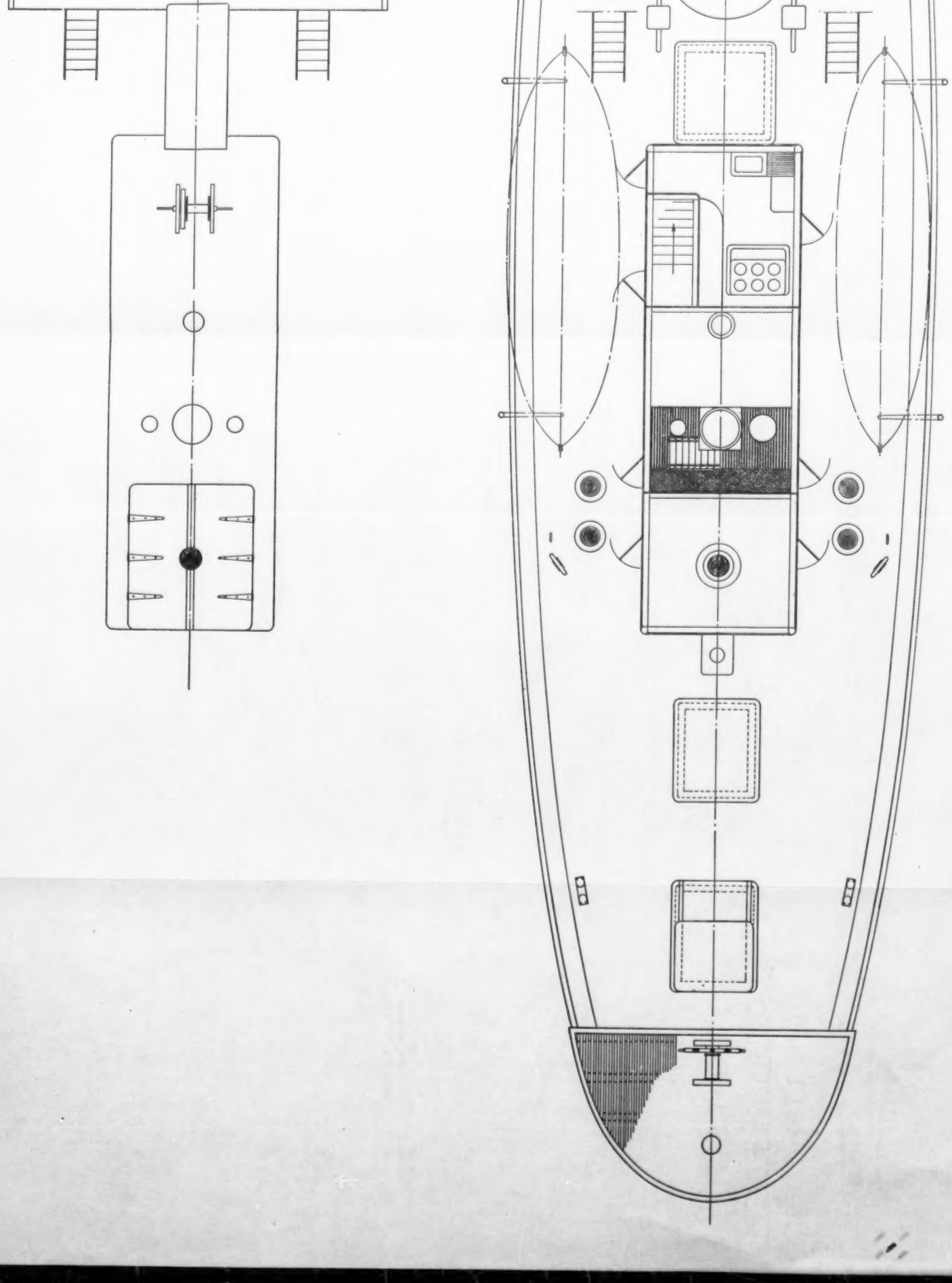


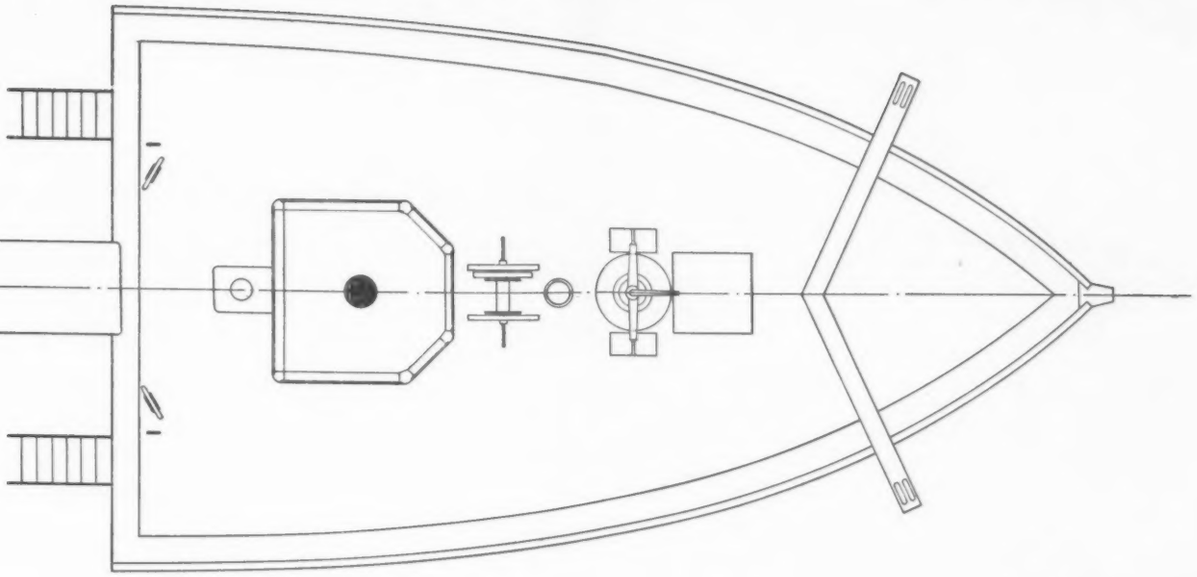
LENGTH BET. PERPS.	112'-0"
BREADTH, MLD.	26'-9"
DEPTH, MLD.	13'-6"

LIGHTSHIP
COLUMBIA RIVER
1891

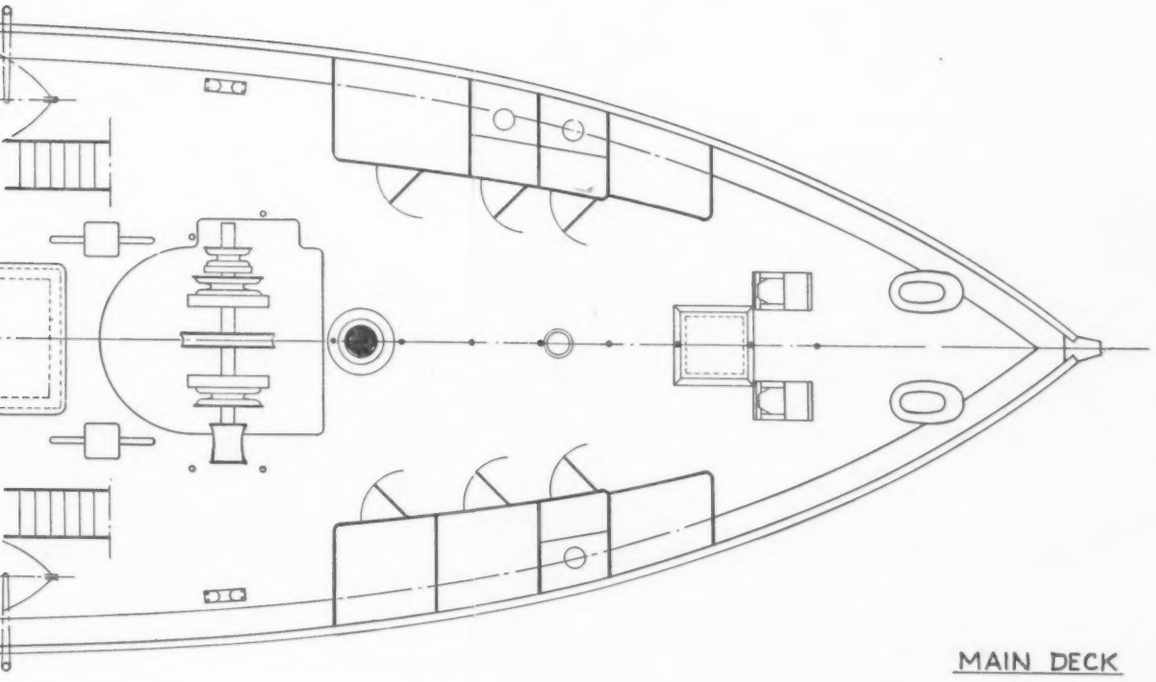
0 5 10

REDRAWN FROM ORIGINAL
W.A.BAKER - 1946





FORECASTLE DECK
AND TOP OF HOUSE



MAIN DECK

LIGHT SHIP
COLUMBIA RIVE
1891

0 5

REDRAWN FROM ORIGINAL
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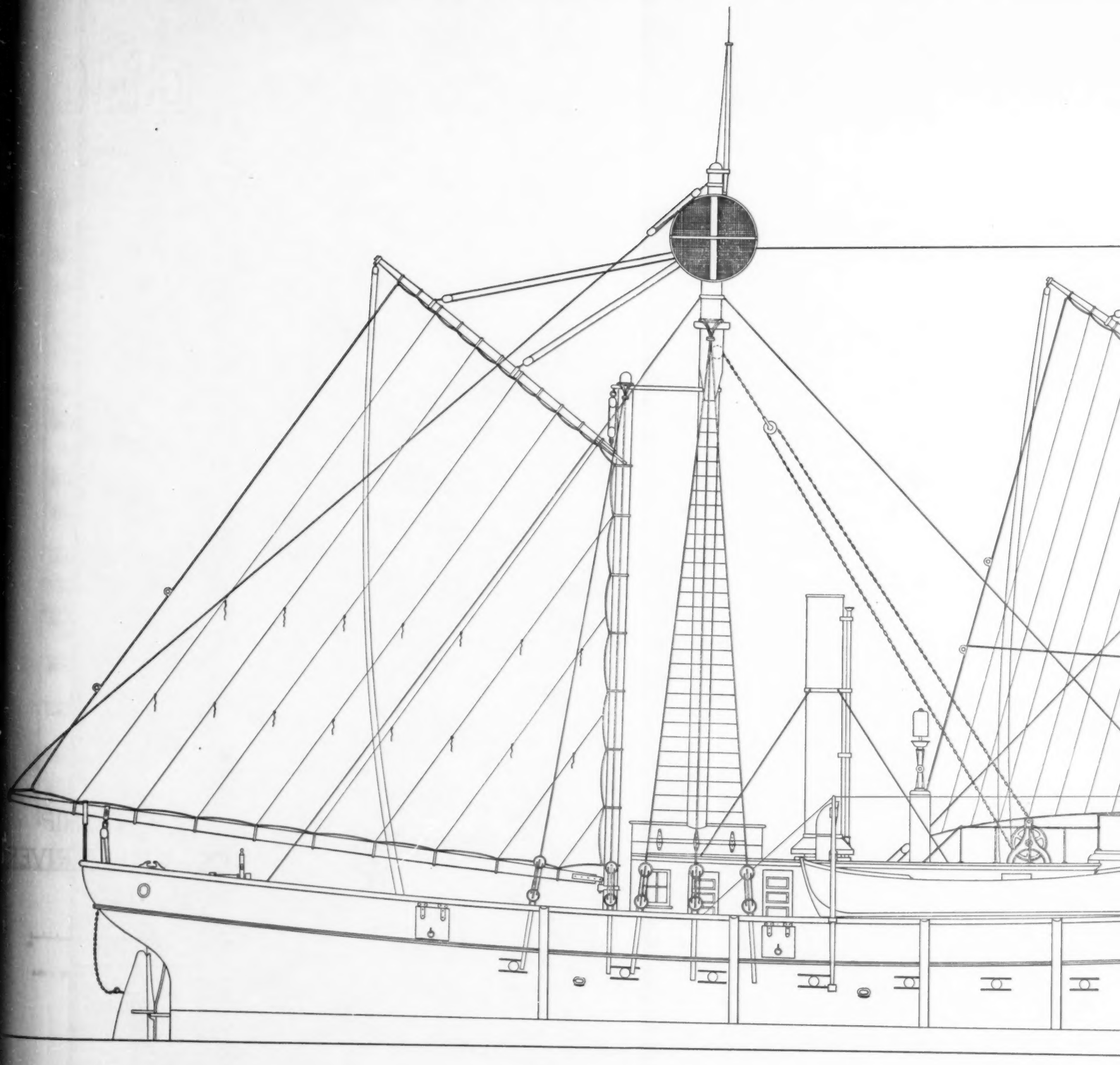

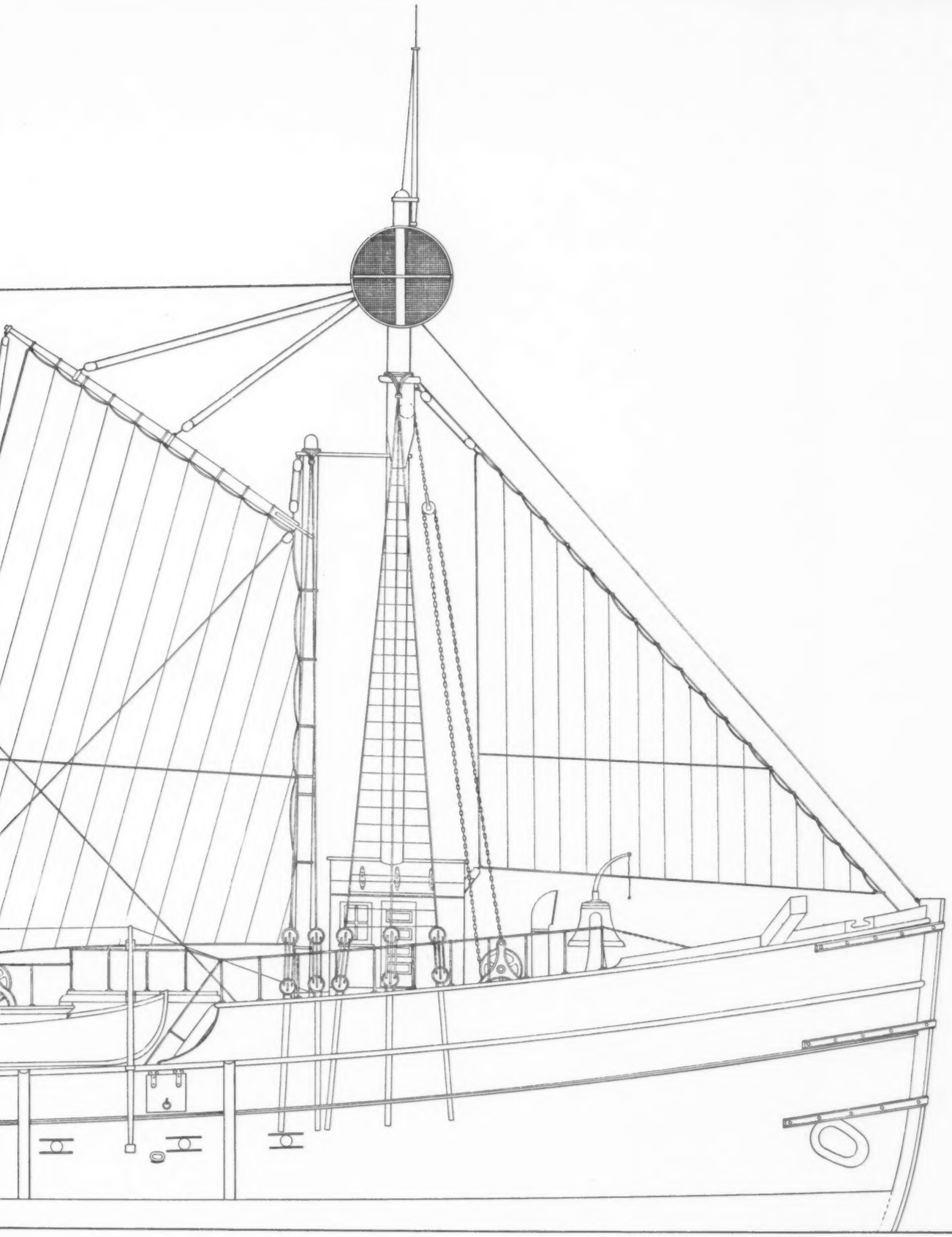

LIGHTSHIP
COLUMBIA RIVER
1891

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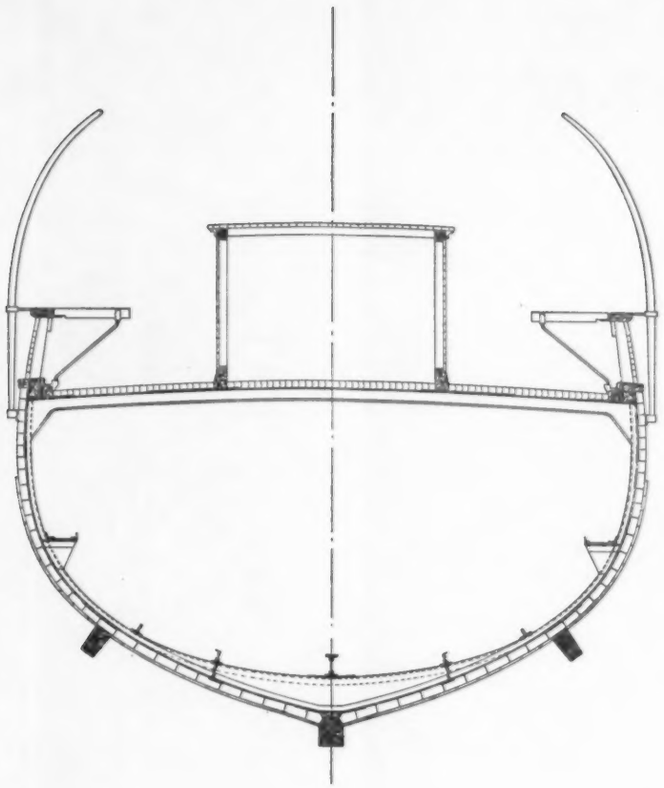
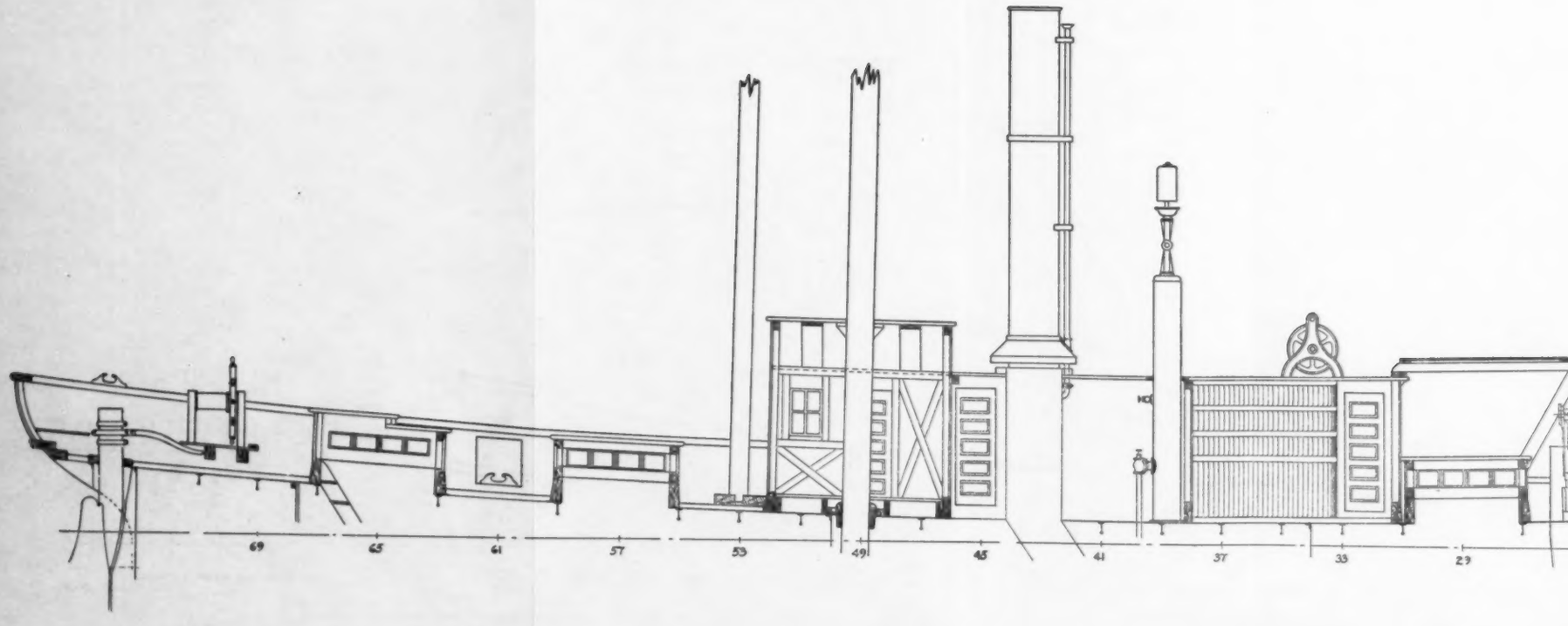
W.A. BAKER - 1948

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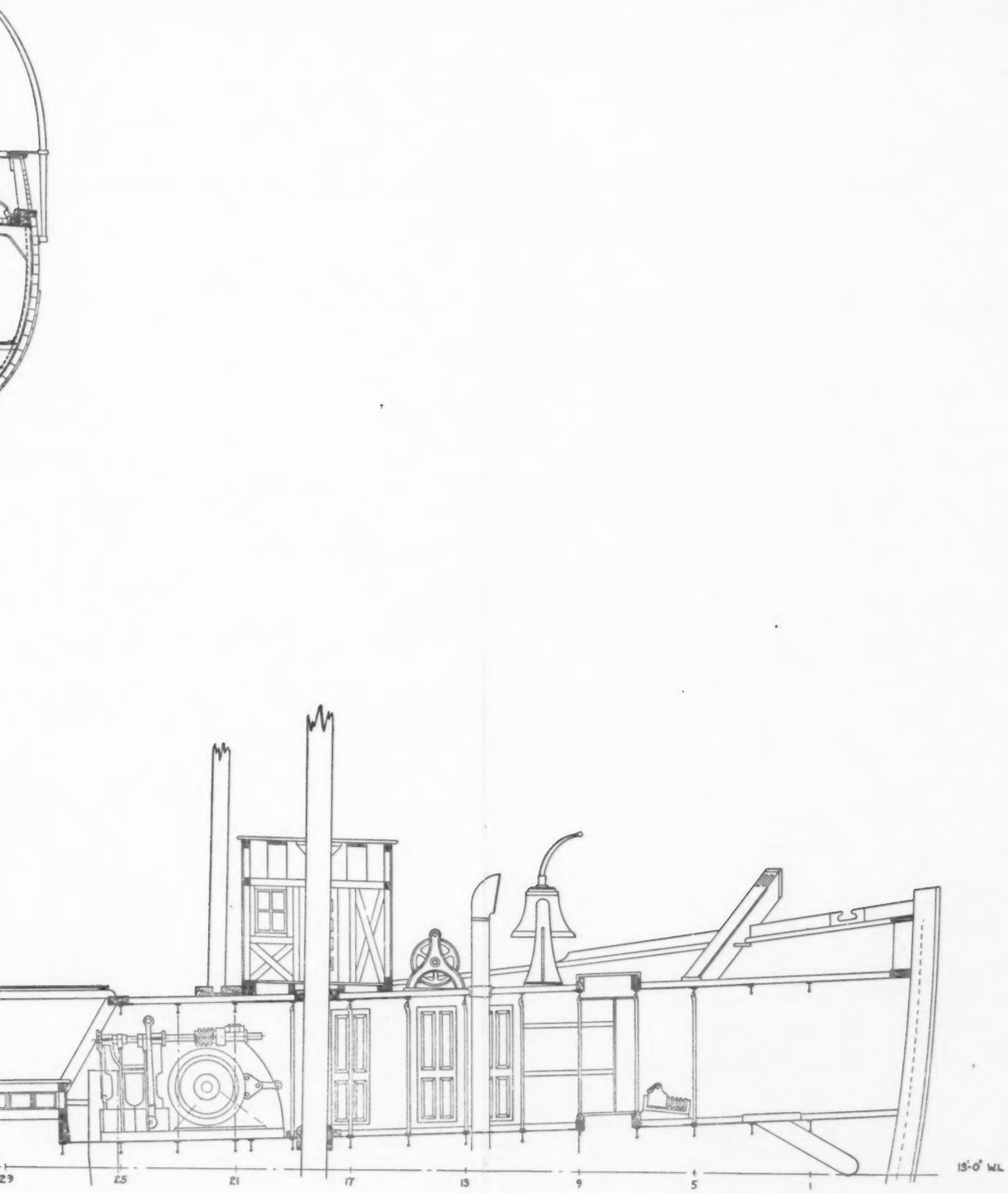


LIGHTSHIP
COLUMBIA RIVER
1891

0 5 10

REDRAWN FROM ORIGINAL
W.A. BAKER - 1948

PIONEER TRANSATLANTIC PADDLE STEAMERS

Table I — Construction

Name(s) of paddle steamer	Date of launch	Owners of vessel	Builders of hull	Materia of hull
Savannah	22 August 1818	Savannah Steam Ship Co	Francis Fickett, Corlears Hook, New York	Wood
Rising Star	5 February 1821	Thomas Cochrane, Tenth Earl of Dundonald	Daniel Brent, Rotherhithe	Wood
Galibi (a) Caroline (b) Louise (c)	1823	French Navy (b)	Built at Rouen	Wood
Calpe (a) Curaçao (b)	September 1825	American and Colonial Steam Navigation Co. (a) Netherlands Navy (b)	J. H. and J. Duke, Dover	Wood
Royal William (a) Isabella Segunda (b)	27 April 1831	Quebec and Halifax Steam Navigation Co. (a) Spanish Navy (b)	Black and Campbell, Quebec	Wood
Rhadamanthus	April 1832	British Navy	Admiralty Dockyard, Devonport	Wood
Sirius	1837	St. George Steam Packet Co. British and American Steam Navigation Co.	Robert Menzies and Son, Leith	Wood
Great Western	19 July 1837	Great Western Steamship Co.	William Patterson, Bristol	Wood copper
Royal William	1837	City of Dublin Steam Packet Co. Transatlantic Steamship Co.	William and Thomas Wilson, Liverpool	Wood
Liverpool (a) Great Liverpool (b)	14 October 1837	Transatlantic Steamship Co. (a) Peninsular and Oriental Steam Navigation Co. Ltd (b)	Humble and Milcrest, Liverpool	Wood
British Queen	24 May 1838	British and American Steam Navigation Co. Belgian Government	Curling and Young, Limehouse	Wood copper
Unicorn	1836	Messrs. G. and J. Burns British and North American Royal Mail Steam Packet Co.	Robert Steele and Son, Greenock	Wood
President	7 December 1839	British and American Steam Navigation Co.	Curling and Young, Limehouse	Wood
Britannia	5 February 1840	British and North American Royal Mail Steam Packet Co. (Cunard Line)	Robert Duncan and Co., Greenock	Wood

[1] Over collapsible paddle-wheels, when in use.
[2] Calculated on the over-all breadth.
[3] As reconstructed for the Peninsular and Oriental Co.

onstruction and Dimensions

	Material of hull	Measurement		Length			Breadth		Depth below deck, ft.	Draught mean, ft.	Complement	
		Gross, tons	Burden, tons	Over-all ft	Between perps., ft.	Keel, ft.	Hull, ft.	Over sponsons, ft.			Total crew	Passengers
York	Wood	320	abt. 170	abt 110	98·5		25·8	abt. 36[1]	14·2	abt. 13		32
	Wood	428			123·6		27·8		6·1	abt. 5·5		
	Wood	abt. 350	abt. 190		121·3		23·0	abt. 39	abt. 6	5·5		
	Wood	438	239	147·2	127·3	114·7	26·9	44·9	16·5	abt. 13·5	42	26
	Wood	1370[2]	363	182·0	160·0	146·0	28·0	44·0	17·8	14·0	36	130
	Wood	813		abt. 205	179·4	143·2	abt. 27·5	46·0	17·8	14·5	60	
	Wood	703	412	208·0	178·4	170·0	25·8	47·3	18·3	15·0	35	
	Wood, coppered	1320	680	236·0	212·0	205·0	35·3	58·3	23·2	16·7	60	140
	Wood	617	403	abt. 200	175·0		27·0	abt. 45	17·5	11·0		80
t,	Wood	1150 1540[3]	560	240·0	223 0		30·8	56·0	21·0			98
	Wood, coppered	1862	1053	275·0	245·0	223·0	40·5	64·0	27·0	17·0	abt. 80	207
	Wood	648	390	abt. 185	162·9		23·5	abt. 40	17·3			
	Wood	2360	abt. 1350	268·0	243·0	220·0	41·0	64·0	32·7	17·8	80	abt. 207
	Wood	1156	619	228·0	207·0		34·3	56·0	22·5	16·8	89	115

PIONEER TRANSATLANTIC PADDLE STEAMERS

Table II ~ Machine

Name(s) of paddle steamer	Builders of machinery	Horse-power		Cylinders			Steam	Paddle-w	
		Nominal h.p.	Indicated h.p	Number	Diam., in	Stroke, in.	press., lb. per sq. in.	Diam., ft.	Widt ft.
Savannah	Stephen Vail, Morristown, N.J.	72	90	1	40	60	abt. 1	15·3	4·5
Rising Star	Maudslay, Sons and Field, Lambeth	70		2	abt. 42	abt. 36	2 to 3	abt. 13·5	abt. 7
Galibi (a) Caroline (b) Louise (c)	Manby, Wilson, Henry et Cie., Charenton	50		2	29	36	2 to 3	abt. 13	6·3
Calpe (a) Curaçao (b)	Maudslay, Sons and Field, Lambeth	100	abt. 150	2	40	48	3	15·0	7·0
Royal William (a) Isabella Segunda (b)	Bennet and Henderson,[2] Montreal	200		2	abt. 51	abt. 60	abt. 4	18·5	6·3
Rhadamanthus	Maudslay, Sons and Field, Lambeth	220	385	2	55·5	60	3·5	20·0	abt. 7
Sirius	Thomas Wingate and Co., Whiteinch	320		2	60	72	5	24·0	abt. 8
Great Western	Maudslay, Sons and Field, Lambeth	450	750	2	73·5	84	5	28·8	10·0
Royal William	Fawcett and Preston, Liverpool	270	400	2	48·5	66	5	24·0	7·0
Liverpool (a) Great Liverpool (b)	Forrester and Co., Liverpool	468		2	75	84	5	28·5	abt. 9
British Queen	Robert Napier, Camlachie	500	700	2	77·5	84	5	30·0	9·5
Unicorn	Robert Napier, Camlachie	260	560	2	abt. 57	abt. 66	5	abt. 22	abt. 6
President	Fawcett and Preston, Liverpool	540		2	80	90	5	31·0	9·3
Britannia	Robert Napier, Camlachie	440	740	2	72	82	9	28·0	8·8

[1]Date of arrival at Cayenne is not on record
[2]Crankshafts by Robert Napier, Camlachie
[3]Served afterwards between Halifax, Pictou and Quebec.

~ Machinery and Service

Paddle-wheels			Speed of vessel, knots	Ports of departure and arrival, first Atlantic crossing	Dates of departure and arrival	Time taken, days, hrs	Mean speed, knots	Historical importance of steamer
Diam, ft.	Width, ft.	Revs per min						
15·3	4·5	16	4	Savannah to Liverpool	24 May to 20 June 1819	27d. 11h.	6	First steamer to cross Atlantic
abt. 13·5	abt. 7·5	abt. 22	5 to 6	Gravesend to Valparaiso	22 October 1821 to April 1822			First to steam westwards across Atlantic
abt. 13	6·3	21	7	Brest to Cayenne	14 December 1824[1]		abt. 5	First steamer in the French Navy (b)
15·0	7·0	22	abt. 8	Hellevoetsluis to Paramaribo	26 April to 24 May 1827	28d	6	First steamer in the Netherlands Navy (b)
18·5	6·3	abt. 20	abt. 8	Pictou to Cowes	18 August to 6 September 1833	19d.	abt. 6	First Canadian steamer to cross Atlantic (a) First steamer in the Spanish Navy (b)
20·0	abt. 7·3	18	abt 8	Plymouth to Barbados	21 April to 17 May 1833	26d.	6·1	First British Naval steamer to cross Atlantic
24·0	abt. 8·5	15	abt. 9	Cork to New York	4 to 22 April 1838	18d. 10h.	6·7	First to cross Atlantic under continuous steam
28·8	10·0	15	abt 11	Bristol to New York	8 to 23 April 1838	15d. 5h.	8·8	First steamer built for the Atlantic Ferry
24·0	7·0	16·5	abt. 11	Liverpool to New York	5 to 24 July 1838	18d. 23h.	7·3	Smallest to cross Atlantic under continuous steam
28·5	abt. 9·0	abt. 15	10	Cork to New York	6 to 23 November 1838	16d. 17h.	7·9	First two-funnel steamer on the Atlantic Ferry (a)
30·0	9·5	abt. 15	10·2	Portsmouth to New York	12 to 27 July 1839	15d. 12h.	8·4	Finest Atlantic steamer of her time
abt. 22	abt. 6·5	abt 18		Liverpool to Halifax[3]	16 to 30 May 1840	14d.	8	First vessel owned by the Cunard Line
31·0	9·3	abt. 15	abt. 10	Liverpool to New York	1 to 17 August 1840	16d. 12h.	8·4	First Ferry steamer lost on the Atlantic
28·0	8·8	16		Liverpool to Halifax	4 to 15 July 1840	11d. 4h.	10	First vessel built for the Cunard Line

dicated in such a sketchy manner as to raise questions concerning their actual construction on the ship. These are redrawn as nearly as possible in the same manner shown originally in the hope that future searching may uncover clarifying details or that some reader may be able to solve the conflict.

The keel for No. 50 was laid on 19 August 1891 and she was launched into San Francisco harbor on 26 March 1892, at 9:50 A.M. She was completed on 9 April 1892. Her launching drafts were 10 feet forward and 8 feet aft; the mean load draft was 11 feet with 16¾ short tons of pig iron ballast in the stern. The list of ships built by the Union Iron Works gives the following data:

Length over all	123′-0″
Length between perpendiculars	112′-0″
Breadth, molded	26′-9″
Depth, molded	13′-6″
Displacement	425 tons
Gross tonnage	250

As may be seen from the midship section, No. 50 was of typical composite construction. The keel was of pine sided and molded 12 inches with a 3 x 12 inch false keel and 2 x 12 inch shoe of oak. The longitudinal strength of the hull was provided by steel plate keel, centerline and side keelsons, bilge and lower deck stringers, main deck stringer and tie plates, and bilge and sheer strakes of plating. A riveting schedule on the original midship section refers to diagonal plates but whether they were on the hull or main deck or both is impossible to determine from the available plans.

The transverse frames were generally 3½ x 4 x ½ inch angles spaced 18 inches. A reverse bar of the same size ran to the main deck on beam frames and terminated at the lower deck stringer on other frames. The main deck beams were 7 x 4¼ x $\frac{7}{16}$ inch bulb tees having 7 inch camber in 26 feet 9 inches.

Since the lines are drawn to the inside of the planking the following data on the planking will be necessary to anyone contemplating the construction of a model of the ship. All planking was of pine 4 inches thick of varying widths at the midsection as follows: from the underside of the plankshеer 7 strakes 6 inches wide, 4 strakes 8 inches, 7 strakes 10 inches, and the remaining 9 strakes 12 inches wide. The garboard was about 9 x 5 inches. Planks were secured to the frames with ¾ inch diameter galvanized iron bolts. Steel straps $\frac{9}{16}$ of an inch thick and of the same width

as the plank were riveted between the frames as necessary to take the butts.

The hull was sheathed with 1½ inch thick white oak covered with hair felt and then coppered. Tar felt was fitted between the sheathing and planking. The sheathing was secured to the planking with 4 inch composition spikes.

A bilge keel about 55 feet long was fitted as shown on the midsection being 13 inches deep amidships tapering to 7 inches deep at the ends. The main member tapered from 9 inches at the hull to 7 inches and was capped by a 2 x 7 inch oak shoe. The bilge keel proper was secured to the hull at every frame by a 1¼ inch galvanized iron bolt while the shoe was secured with spikes.

Decking was 3½ x 3½ inch pine secured with $\frac{9}{16}$ inch diameter iron bolts; waterways were 6 x 14 inch pine and the planksheer 4 x 14 inch pine. Both the waterway and the planksheer were slotted for teak bulwark stanchions sided 8 inches with the molded dimension tapering from 6 inches at the top of the planksheer to 4½ inches. The bulwark planking was 2 inches thick and the cap rail was 4 x 12 inch teak.

The houses were entirely of wood—12 x 6½ x 5½ inch coamings, 4½ x 4 inch framing, 6 x 5½ inch headers and 4 x 4 inch beams, all of yellow pine. House sides were 1¼ x 4 inches tongue and grooved and the tops 2 x 4 inches, both of white pine. So much for the structure.

The majority of the deck erections and fittings are obvious but a few explanatory notes may be helpful. Abaft the very obvious hawse pipes on the main deck forward are the chain stoppers. At the sides of the vessel under the forecastle deck are a set of shelves, the crew's and officers' water closets, and lockers for boatswain's stores and miscellaneous gear.

As shown on the inboard profile the anchor windlass appears to have been driven by a two-cylinder steam engine working through a worm gear but the original deck plan indicated only the windlass shaft as drawn. The detail plans of this windlass have disappeared but there is a possibility that it was a purchased item and not constructed by the shipyard. Heavy riding bitts are shown just abaft the windlass.

The companionway in the forward end of the main house led down to the crew's quarters on the berth deck, the one aft on the main deck to the officers' quarters. The two cowl ventilators on the housetop abreast the stack were the same size—12 inch diameter—but below the housetop the starboard duct was enlarged to house the ash hoist. The four flush scuttles in the main deck led to the coal bunkers.

For the generation of steam, the vessel was equipped with two natural

draft Scotch boilers about 6 feet 6 inches in diameter and 7 feet 3 inches long. Steam was used for the fog whistle and its operating mechanism, for the anchor windlass as previously noted, and for heating the quarters.

The ship carried two small boats, both 26 feet long. The starboard boat was noted as a gig while the port one was a whaleboat with centerboard. When swung inboard each boat was supported by two swinging cradles hinged to the bulwark as shown on the midship section. Chocks shaped to fit the boats were hinged to the cradles.

It is interesting to note that the method of handling the lanterns did not change materially during the nineteenth century. The model of the *Goodwin* light-vessel of the early part of the century had essentially the same chain halliard and hand winch hoisting gear.[5] On No. 50 the lanterns were stowed in hinged top houses when not in use. One advance during the century was the addition of separate masts which enabled No. 50 to make sail with the lanterns hoisted.

The day shapes at the mast-heads are not quite as solid as they appear on the profile. They were constructed of two net covered frames fixed 90° apart. The short topmasts with their lightning rods should be noted.

After the tracings for the accompanying plans had been forwarded to the Editors, Plate 29 showing the ship alongside the builder's outfitting wharf was unearthed. Several changes made during construction are readily apparent. Both lantern winches were moved forward from the positions shown on the plans and backstays added to the foremast. The forward cowl ventilator has been raised to the level of the lantern house and 'Charley Noble' can be discerned in line with the fog whistle. The method of opening the tops of the lantern houses is clearly shown—a chain bridle on the hinged cover with a tackle to the shrouds.

The above data and the accompanying plans should partially meet the Editors' request in Volume V, Number 2, for material concerning 'the construction, service and vicissitudes of light-vessels prior to 1900.'

[5] W. R. Chaplin, 'The Trinity House Ship Models,' THE AMERICAN NEPTUNE, IV (1944), Plate 48.

The Sailmaker's Gear

BY M. V. BREWINGTON
Drawings by Catharine A. Perry

NEXT to the shipcarpenter and the ropemaker the sailmaker is probably the oldest of all the specialized maritime artisans. His trade is certainly the least changed in its methods and its gear. The shipcarpenter has traded his wooden tools for ones of steel: his hand auger has given place to the electric drill and his broad axe to the band saw; the ropemaker no longer turns his winch manually as he treads the rope walk: an electric spinning machine now does all the work. But the sailmaker still cuts his cloth in the same way his trade ancestors did and no machine has yet been devised to rope a sail. In fact, practically all his tools except the sewing machine are more than a century old in design and material as well as in use.

Undoubtedly the *needle* is the oldest piece of his gear: its origin is lost in the dimness of prehistory. Just how many centuries went into its evolution we do not know, nor do we know when the needle attained its specialized form for sailmaking. Both Sir William Monson (1624) and Captain John Smith (1626) speak of needles in the boatswain's charge, obviously for sailmaking, but neither gives a word to tell us of their size or shape. By 1676 it appears to have come into being because in that year John Davis mentioned *sail* needles in the outfit of the frigate *Degrave,* implying differences in some respect from those used in the household. But again no description of size or shape is given. Thomas Blanckley (1732) speaks of two types of needles, boltrope and sail, though once more no description aids in differentiating between them and the tailor's needle. The extant records of the Continental Navy provide little or no help: sail and boltrope needles are mentioned frequently, but no specifications are given. Their high value then, however, is shown by the careful manner in which all needles are accounted for. When Romme prepared his article on sailmaking, *L'Art de la Voilure* for the *Description des arts et des metiers* . . . 1761-1789, the needle had definitely taken the shape we know today. It is shown clearly in an engraving: triangular in section at the

point (the blade or the 'square') becoming circular (the shank or 'wire') as the eye is approached. The blade is always slightly larger in section than the shank or the well-twisted twine so that the twine will not 'hang' as it passes through the cloth. By 1794 nine sizes were in existence, each one having its own name: 'large marline, small do, double bolt rope, large bolt rope, small do, store, old work, tabling and flat seam,' progressing from the largest to the smallest. The United States Navy in 1826 allowed its sailmakers four sizes: 'sail, roping, marline and sewing.' By 1844 Navy needles were described as 'seaming, 4 thread, 6 thread, 8 thread, and 10 thread'; by 1880 as 'seaming nos 14, 15, 16, and 17, 4 thread, 6 thread, and 8 thread'; and a decade later as 'seam, 4 thread size 12, 6 thread size 9, 10 thread size 8.' Taunt classified needles as 'roping sizes 4 to 12' and 'seaming sizes 14 to 17.' Today all needles are known by numbers ranging from the smallest, size 18 (about 2⅛ inches long), to the largest, size 6 (about 4⅝ inches long).

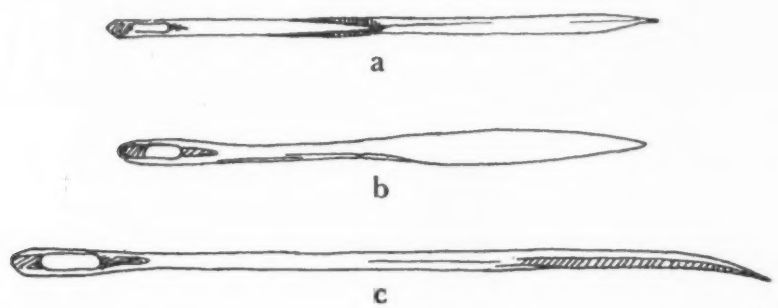


Fig. 1. Needles: a, long square; b, short square; c, bagging. All based on present day examples.

To the untrained eye all sail needles appear to be of the same design; actually there are two: 'short square' or 'lolley' (figure 1b) and 'long square' (figure 1a). The first was originally designed by William Lolley, an English needlesmith. It is the better roping needle whereas the long square needles are preferred for seaming. The difference between the two lies solely in the proportions between the square and the shank. The curved needle (figure 1c) so often thought by laymen to be a sailmaker's needle in reality has no place in his gear bag. It is a 'packing' or 'bagging' needle used for sewing up bales cased in burlap. A sharpening stone, generally a water stone, and polishing rouge to keep the needles well pointed and clean are always a part of the equipment.

Every sailmaker seems to have a preference for the needles of a certain

manufacturer, one man wanting W. Smith & Son needles and another man wanting Jas. Smith & Sons needles. These seem to be individual preferences just as one person wants a Ford and another a Chevrolet.

Needles are customarily stored in cases made of almost every kind of material: cloth, leather, wood, bone, or metal. For small quantities the cases were usually tubular, at times highly decorated with carved or knotted string work (figure 2a and b). Larger numbers were stowed in cloth or cloth lined leather rolls (figure 2c). All of these were made by the sailmakers in their spare time.

With the needle goes the *twine*. Again even the word is lost in antiquity, but the various sizes of needles imply various sizes of twine. None are specifically mentioned in maritime literature until Steel published his work on sailmaking in 1794. He speaks of two sizes: 'Extra for seaming' and 'ordinary for roping,' but almost half a century before a merchant offered through the advertisements in the *Maryland Gazette*, 2 July 1752, 'sewing and bolt-rope twine.' Today many sizes numbered 4 to 10 are in use and to make even stronger stuff for seaming and roping the heavier weights of canvas, the sailmaker uses two to four pieces of twine which after threading are twisted into a single entity. The size number of the twine indicates the number of 'plys' used in spinning it. The Navy between 1844 and 1891 issued two kinds of twine for special uses: 'cotton for stitching and roping; flax for whipping and marling,' a distinction which is not held

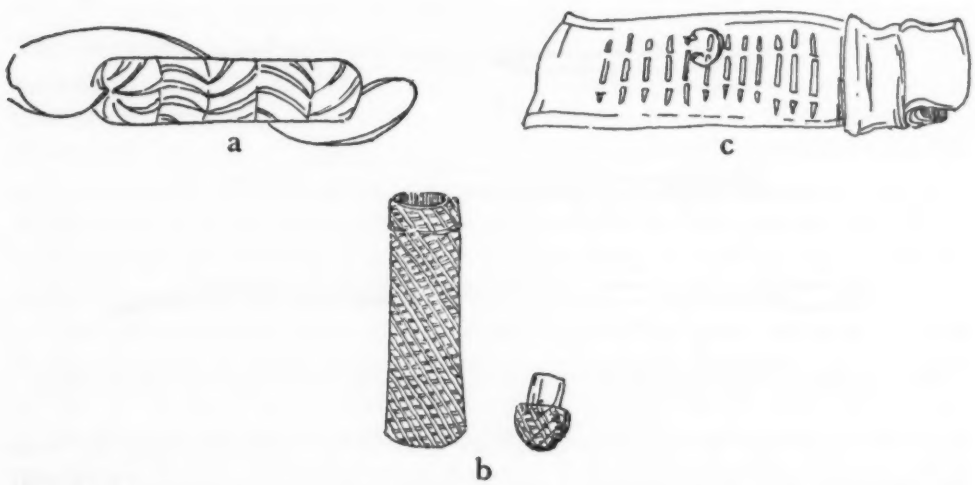


Fig. 2. Needle cases: a, after Ashley and b, The Mariners' Museum, both wood encased in string; c, flannel roll, author's collection.

today, practically all twine being cotton with the best quality made up of so-called Egyptian fibres.

The third partner in all hand sewing is *beeswax*. This certainly has been used in sailmaking since 1732 and probably for a century earlier. Before beeswax came into use, pitch and tar thinned with lard oil seem to have been used to hold the twine in its twist, to lubricate its passage through the cloth, and to preserve it. The tallow occasionally found in sailmaker's equipment was not used in sewing but as a lubricant in splicing.

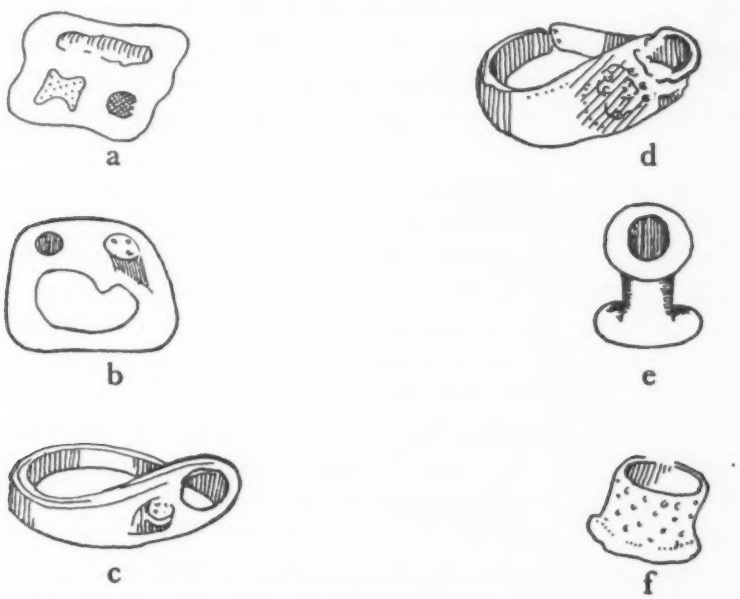


Fig. 3. Palms: a, after Blanckley; b, after Steel; c and d, seaming and roping palms, author's collection; e, thumb stall, after Steel; f, thimble, after Ashley.

Of all the sailmaker's gear, the *palm* is the tool most closely associated with the trade in the minds of laymen. Strange to say none of the early writers such as Smith, Mainwaring, or Monson mention it, and the *New English Dictionary* traces the word only to the 1769 edition of Falconer's *Marine Dictionary*. Blanckley thirty-five years before Falconer names and describes the tool.

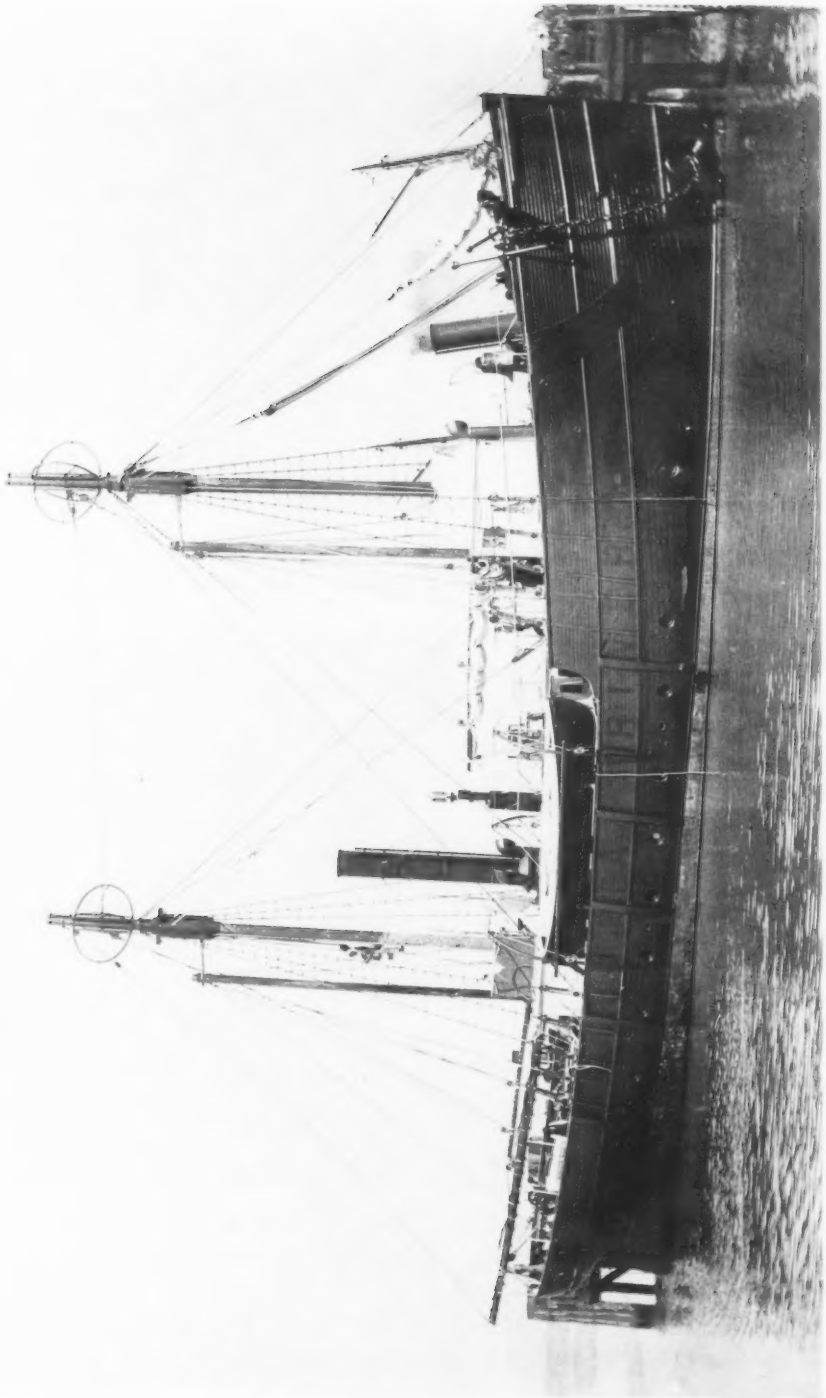
> Palms are round Pieces of iron stamp'd full with round Impressions; are sewed to Leather which comes into the Palm of the Sailmakers Hand, and are made use of by them when sewing the Seams or Boltropes on the Sails.

The engraving of Blanckley's palm (figure 3a) does not quite follow the description and probably represents an even earlier type: the iron is not

round but oblong and the leather does not make a flat band about the hand; until formed by much use it would lie edgewise around the hand. However, the description is so detailed one feels sure the palm had undergone considerable development before he wrote, the engraving showing one of the stages. This view is supported by a small representation of a palm in a Spanish manuscript of 1719 reproduced by de Artiñano in his *Arquitectura Naval Española*. This palm appears to be well developed, a fingerless, half-thumbed glove bearing an oval metal plate. Falconer leaves no doubt of the shape of the English sailmaker's palm in his description: '. . . the leather [or canvas] is formed so as to encircle the hand and buttons on the back thereof.' From then at least to the present day the palm has remained the same in its design, though one should note that in the old days 'palm' referred only to the metal part while now the whole device is given the name.

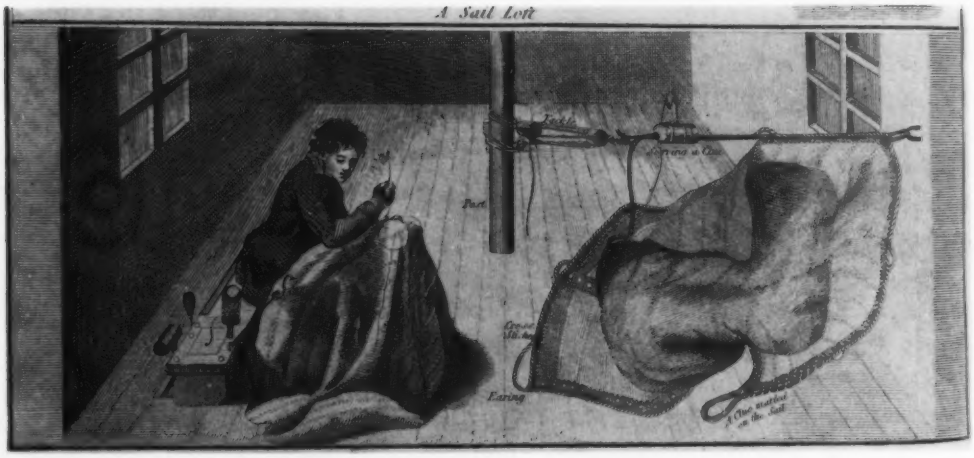
Today there are two different kinds of palm: one known as a *seaming palm* (figure 3c) and the other as a *roping palm* (figure 3d). The point of distinction is in the latter which has an extension of the leather along and around the thumb so that when a boltrope is being sewed to the sail, the twine can be given a turn about the thumb leather to draw it up hard through the rope and cloth without constantly cutting the sailmaker's thumb. The roping palm does not appear until about the first third of the nineteenth century. Until 1869 palms of both kinds were made by the sailmaker for his own use. First he made a paper pattern to fit his hand, then cut the leather to shape, built up the post of leather or wood to carry the iron; and lastly sewed the parts together. The Branson Collection in the United States National Museum has, so far as is known, the only extant complete set of patterns and parts for both seaming and roping palms. When James Smith began to manufacture palms commercially in 1869 the practice of each sailmaker making his own soon died out. Sailors and sailmakers use slightly different palms for both seaming and roping. Generally, although the designs are identical, the sailors' palms are much lighter and softer than those used by sailmakers.

At about the time when the roping palm came into being, another piece of gear, the *thumb stall* (figure 3e), practically disappeared. It was a tube of metal, horn, or leather which fitted around the sailmaker's thumb to prevent it from being cut by the twine when tightening stitches. The roping palm, of course, made the thumb stall unnecessary. A thimble (figure 3f) has survived for very light work; it is the same as the ordinary household sewing thimble except that it is considerably heavier, uncapped, and usually is worn on the thumb.

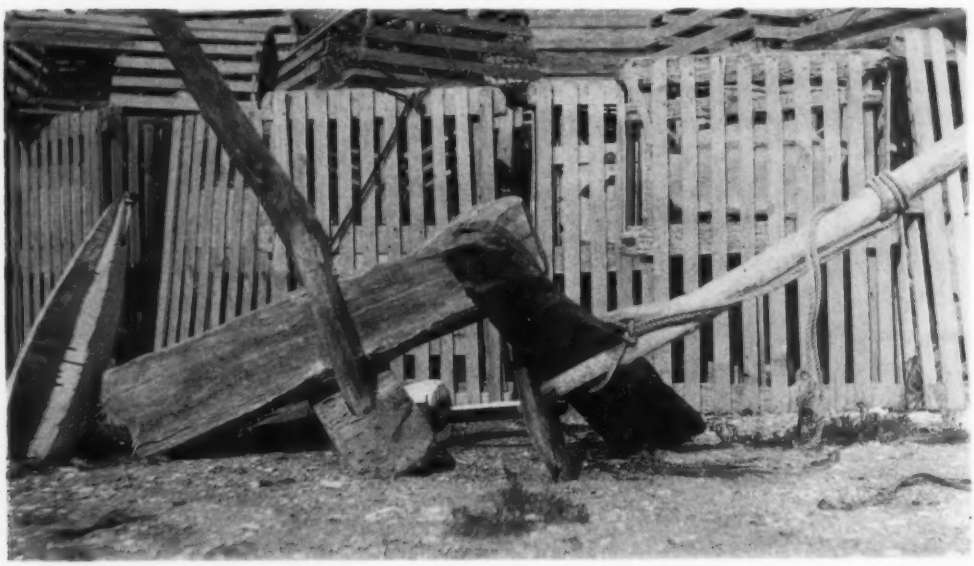


U. S. Light-Vessel No. 50 *Columbia River*

Reproduced from a photograph owned by the Bethlehem Steel Co., Shipbuilding Division, San Francisco



An Eighteenth-century Sailmaker at work
Reproduced from David Steel, Elements of Seamanship *(London, 1794)*



A pair of Killicks at New Harbor, Maine, 1945
Reproduced from a photograph by Dr. E. Lee Dorsett

One whole family of tools grew up for splicing, forming grommets, and working holes through cloth. These were known as *fids, marlin spikes, prickers,* and *stabbers.* The first is today always made of some hard tough wood and the last three are always made of metal, usually steel. On whale ships and around the whaling ports all were frequently made of whale bone.

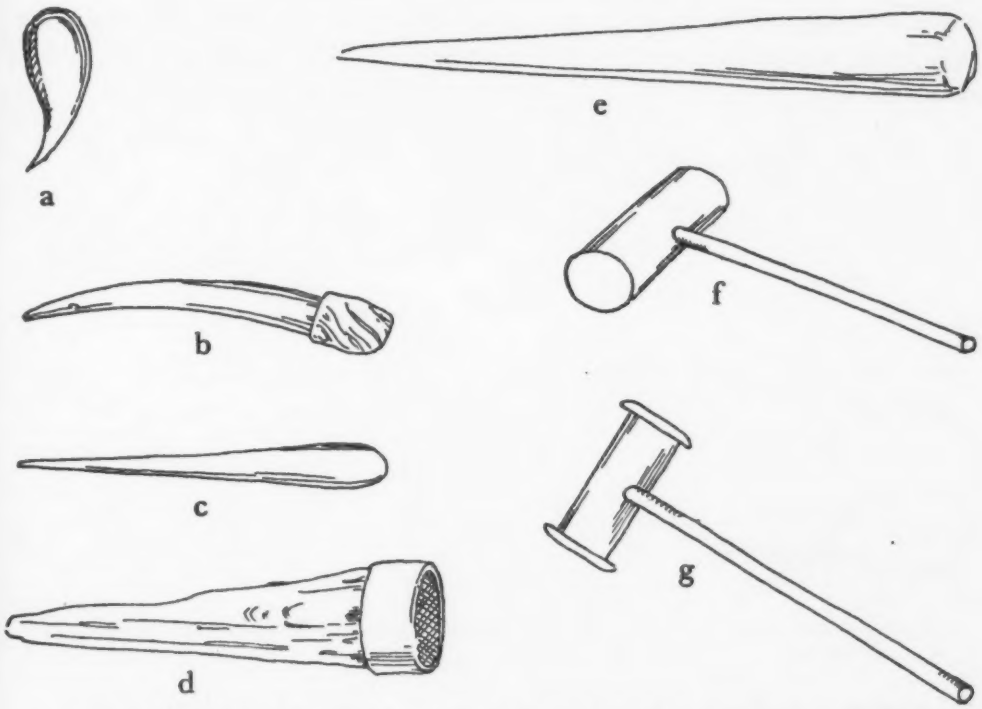


Fig. 4. Fids: a, after Blanckley; b, cow-horn fid, The Mariners' Museum; c, after Steel; d, driving fid, iron bound, The Mariners' Museum; e, iron driving fid, The Mariners' Museum; f, commander, after Steel; g, iron commander, The Mariners' Museum.

The earliest fids according to Mainwaring were of iron. He describes them as 'an iron pin tapering and sharp at the lower end, which is for to open the strands of the ropes when we splice two ropes together; but when we splice cables we use fids of wood in the same form and nature but much bigger which if they were made of iron would be too heavy to work withal.' These iron fids were not used in lieu of marlin spikes because Mainwaring defines them as well. About a century later the same situation existed: the inventory of the Continental frigate *Raleigh* (1778) under the heading 'Iron work for occassional uses' are listed '2 splicing fids' along with several marlin spikes. Wooden fids were also in use as the

store accounts of the Continental frigate *Boston* list '14 wooden fids.' Even today in one sail loft the fid equipment consists of seven sizes of wooden fids and three of iron fids.

For splicing, fids have been in use since the beginning of the sixteenth century at least. The *New English Dictionary* cites an example only as early as 1615 however. But a century earlier is the 'fid of yeron' mentioned in the inventory of the *Great Bark,* 1531. What its shape may have been we do not know, but it probably was little different from the fid as Mainwaring knew it: a cone rounded at the larger end. The earliest drawing of a

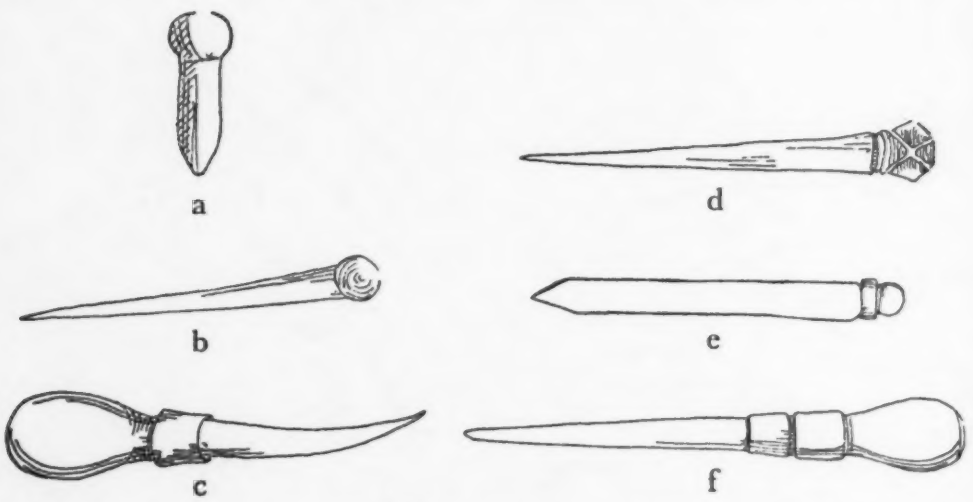


Fig. 5. Marlin spikes: a, after Blanckley; b, after Lever; c, after Steel; d, whale bone, The Mariners' Museum; e, whale bone and f, chisel handled, author's collection.

fid (figure 4a), that in Blanckley's *Naval Expositor,* shows it to have been curved into the shape of a cow's horn. And it is quite possible, indeed probable, that a cow's horn did precede even the 'fid of yeron': farmers spliced rope before sailors. That horns were used as fids is established by the definition given by Duhamel Du Monceau in 1747. He wrote, 'Instrument de corne, de bouis, de bois de gayac, or de fer, pointu par un bout. qui sert à defaire des noeuds, à detortiller les torons d'un cordage &c.' That is corroborated by a cow's horn fid (figure 4b) in the collection at The Mariners' Museum. The curved type seems to have disappeared from general use about 1815.

The lengths and principal diameters of fids varied depending upon the size of the cordage to be worked. Sometime between 1826 and 1844 the larger sized ones used chiefly for forming cringles, grommets, and eyes

in boltropes began to be called *stretching, setting,* or *driving fids* (figure 4d and e) to distinguish them from the smaller sizes called *splicing fids* (figure 4c). The larger end of the setting fid was flat so that it would stand upright on the loft floor. A typical loft owned wooden splicing fids 9, 17, 18½, and 23 inches long; wooden setting fids 18 by 3⅜, 21½ by 4, 31 by 5⅜, and 39 by 6 inches; and iron fids 15½ by 1¾, 16 by 1¾, and 20½ by 2¼ inches. It was impossible to force heavy cordage onto a setting fid or to force a splicing fid into the lay of some cables by hand. For these purposes the sailmaker used a heavy wooden mallet called a *commander* (figure 4f). This tool was in use by 1732 under the name of *driving mallet.* By 1801 both names were in use and the tool was described as being '20

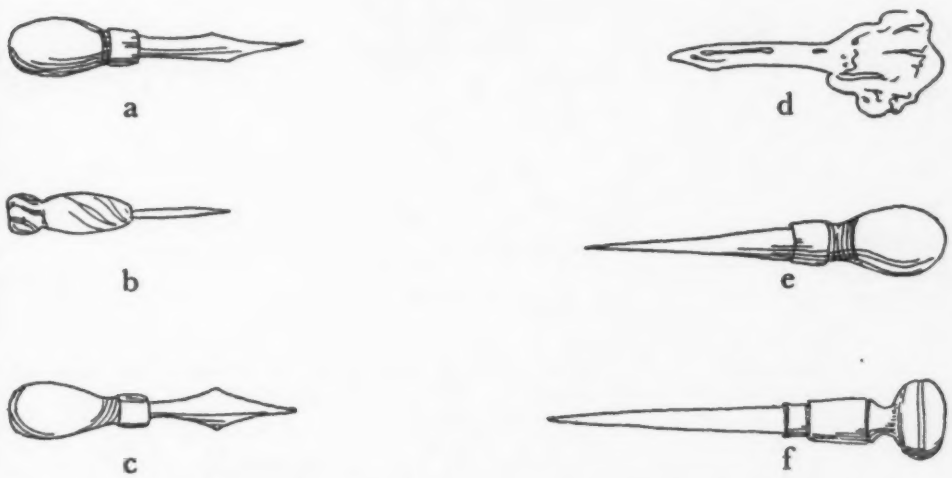


Fig. 6. Awls, prickers and stabbers: a, awl, after Steel; b, awl, after Ashley; c, stabber, after Steel; d, deer-horn pricker, The Mariners' Museum; e, pricker, after Steel; f, pricker, modern, author's collection.

inches long and 8 or 10 inches diameter with a handle three times the diameter [of the head] in length.' Three decades later the head was of iron (figure 4g) and of course much reduced in size.

In conjunction with driving fids, sailmakers frequently used a *fid block,* a cylindrical piece of wood about 18 inches high by 15 inches diameter into one end of which were bored holes approximately two-thirds the major diameter of the fids. The material to be worked was placed over one of the holes, the fid point inserted and then driven home with the commander.

Spikes (figure 5) seem definitely to be the oldest of this family of tools. The word goes back to the late fifteenth century and it was commonly used by the early writers on seamanship. Its design has remained almost

fixed down to the present—a tapered piece of metal, round in section, the thicker end sometimes flat, sometimes knobbed. The spike seems to have been used at first with only the smallest cordage, the stuff from which it takes its name. Boteler says of them: 'They are small Nails of Iron made of purpose for the splicing together of small Ropes; as also to open the Bolt-ropes when they sew them into the Sails.' A true sailmaker's spike never has a lanyard eye (a sailor's spike always should) and frequently it had a wooden handle like that usually found on a chisel (figure 5f). The spike always has had the same functions: to lay open the strands of a rope or to start a hole through a piece of cloth.

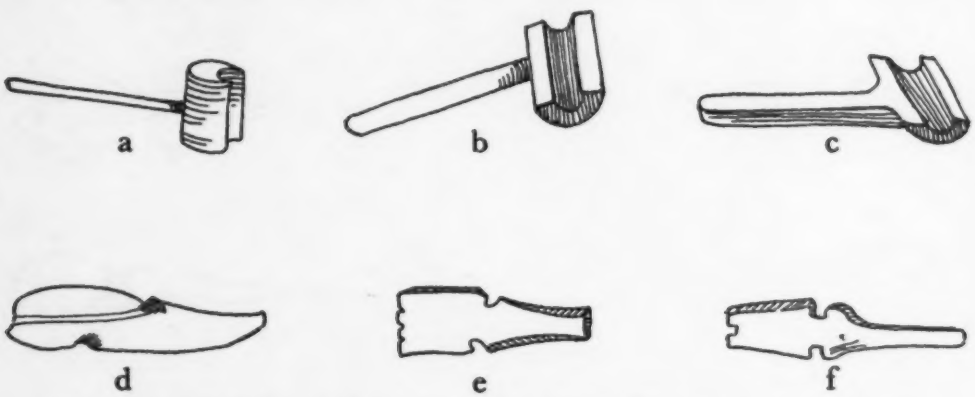


Fig. 7. Serving tools: a, mallet, after Blanckley; b, mallet, Branson Collection, U. S. National Museum; c, mallet, author's collection; d, board, after Steel; e, board, The Mariners' Museum; f, board, after Ashley.

Close akin to the marlin spike were the *prickers* (figure 6e and f) and *stabbers* (figure 6c). The first was originally square in section; the second, triangular and smaller than the pricker. Both had wooden handles. Eventually they lost their angular sections and differed from the spike only in size. Smyth, in fact, describes both as being 'small marline spikes.' Their function was the same as those of the spike but for use with smaller stuff. Both have been in use since 1794 at least. For making the smallest holes in cloth a *pegging awl* (figure 6a and b) was used. Steel described it in 1794 as having a round blade becoming square at the point.

Another family of tools is that used to tighten stitches beyond the power of the roping palm or the thumb stall. The oldest of these is the *serving* or *heaving mallet* (figure 7a, b, and c). It is mentioned by Davis in the outfitting list of 1676. It has carried through until the present time in some sailmaker's outfits, primarily because it is inexpensive, easily made, and adequate for the job. It was as early as 1732 and still is a hardwood cylin-

der about four to six inches long by one and a half inches diameter with a half-round groove along the face and a handle about a foot long by an inch diameter fixed at right angles to the head opposite the groove. The cord to be tightened is carried over the cylinder, or head, and around the handle which was pushed or pulled as a lever. The same tool is also used to serve boltropes. There are other types of serving mallets varying greatly in size but all follow more or less closely the same basic design. *Serving*

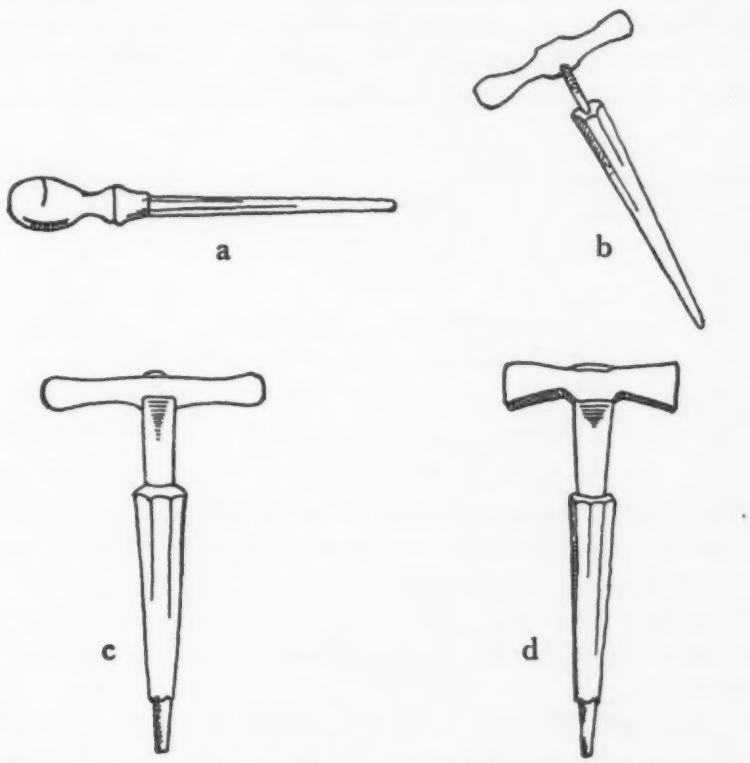


Fig. 8. Heavers: a, early type, The Mariners' Museum; b, after Ashley; c, Branson Collection, U. S. National Museum; d, author's collection.

boards (figure 7d, e, and f), used for the same purpose but with smaller stuff, were known to Steel in 1794. More recent than the heaving mallet but used for the same purpose is the *heaver,* sometimes called a *stitching mallet* (figure 8). It probably dates from the 1860's and is apparently the most recent of all the sailmaker's tools, if the sewing machine be excepted. Since it is the product of a manufacturer, it has as many variants in detail as there are makers. Basically it is a T-shaped tool, the standing part of steel about six inches long; the cross piece or handle about three or four

inches long of either steel or hard wood. The standing part is octagonal in section for most of its length with the end round in section and tapering to a blunt point. A hole about one-eighth inch in diameter and in depth is drilled into the end. The heavier has two uses: to tighten stitches and to push a needle through cloth either too thick for the force of the palm or located in a spot the palm cannot reach. The first operation is performed by giving the twine a couple of turns around the standing part of the heaver, placing the end on the boltrope and twisting the handle (thereby forming a Spanish windlass) until the stitch is hove taut. In the second operation, the point of the needle is inserted in the cloth and the hole in the end of the heaver is placed over the eye of the needle; with one hand on

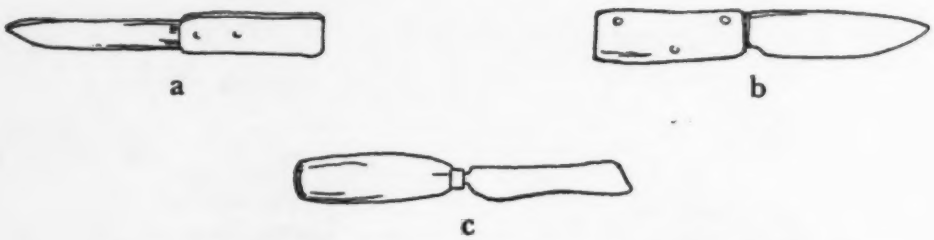


Fig. 9. Knives: a, after Ashley; b, Branson Collection, U. S. National Museum; c, shoemaker's knife, author's collection.

the standing part of the heaver and the other on the handle, the strength of both arms and the back of the sailmaker can be brought to bear on the needle. What appears to be an early form of heaver is in the collection of The Mariners' Museum (figure 8a). Instead of being T-shaped it is straight with a wooden chisel handle, but the blade is identical to that described above.

For cutting cloth, boltrope, and twine the sailmaker has apparently used a *knife* since the earliest days. It was and still is of the type known to cutlers as a 'sticking knife' (figure 9a and b). The facility with which cloth may be cut with this shape of blade exceeds any other. Today the sailmaker's knife has become in many cases anything that will cut cloth and cordage, usually a shoemaker's knife (figure 9c) with a three- to six-inch blade.

The last group of tools actually used in making sails is a miscellaneous aggregation with widely varying duties. The *rubber* (figure 10), in use as early as 1794 to flatten stitches and seams, was made of hardwood, bone, or iron usually chisel shaped. It continued in general use down to the late nineteenth century. It was simply run back and forth over the seams as

the cloth lay on the floor until the stitches were partially buried in the cloth or until a crease was made. Another tool which has disappeared was the *seam gauge* (figure 11). This device, made of bone or wood, was used by the sailmaker more or less as a carpenter uses a marking gauge: that is, to lay out a seam of proper width down a length of cloth, particularly along a gore. The tool is not mentioned in any marine dictionary or in any of the works on seamanship, and no specimens which can be dated have come to light. The *sail hook* (figure 12) is the last piece of specialized

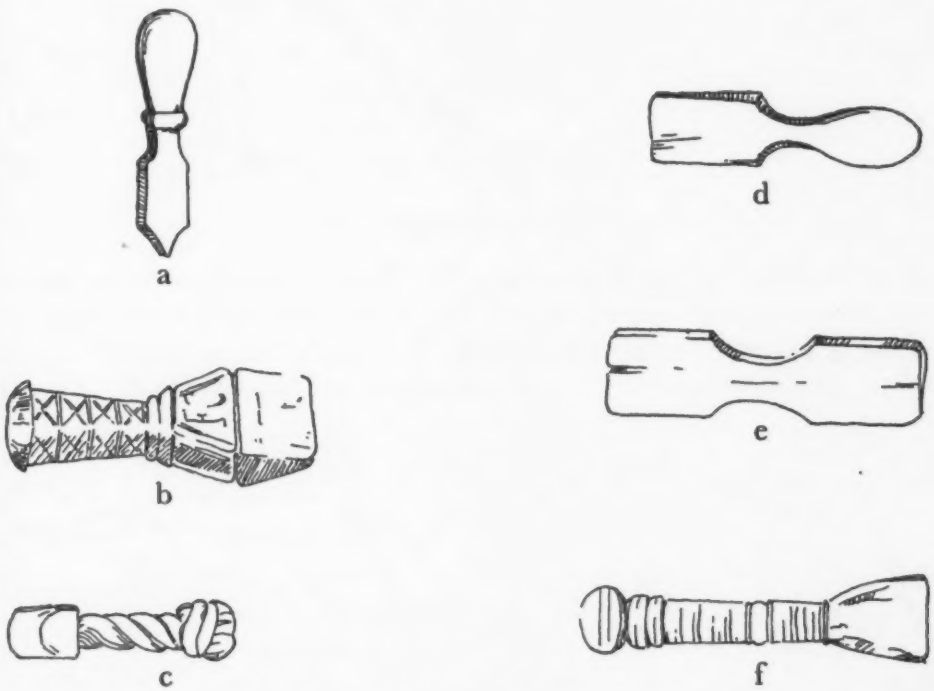


Fig. 10. Rubbers: a, after Steel; b, whale bone, The Mariners' Museum; c, whale bone, after Ashley; d, lignum vitae, author's collection; e, double, of wood, The Mariners' Museum; f, bone, The Mariners' Museum.

gear. It is a sharp hook some three to five inches long made of iron or steel. There are three principal forms, the most recent of which, that made of rod with a swivel eye, is considered the least desirable. The second type is made of rod with a fixed eye and the third is made of flat bar, tapered to each end. The tool has been used since the late eighteenth century at least and still is in everyday use by all sailmakers. Spliced to the hook is a lanyard which is made fast to the right hand leg or end of the bench. It is used to keep the cloth tightly drawn over the knees of the

sailmaker as he works. To extend and hold taut a length of boltrope while serving, the sailmaker makes use of a light watch tackle, the blocks being about three inches long.

In drafting the plans of a sail by which the cloth was laid down, cut, and finished, the sailmaker used tools common to mechanical draftsmen

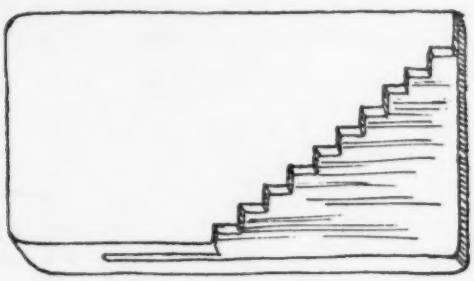


Fig. 11. Seam gauge, Branson Collection, U. S. National Museum.

and the building trades. For drawing the plans on paper, he had a pair of ordinary draftsman's *dividers* and a *scale,* in the old days a Gunter's scale, now an architect's or engineer's scale. To keep his lines at right angles he had what seems to have been a specialized tool: a *square* made of brass,

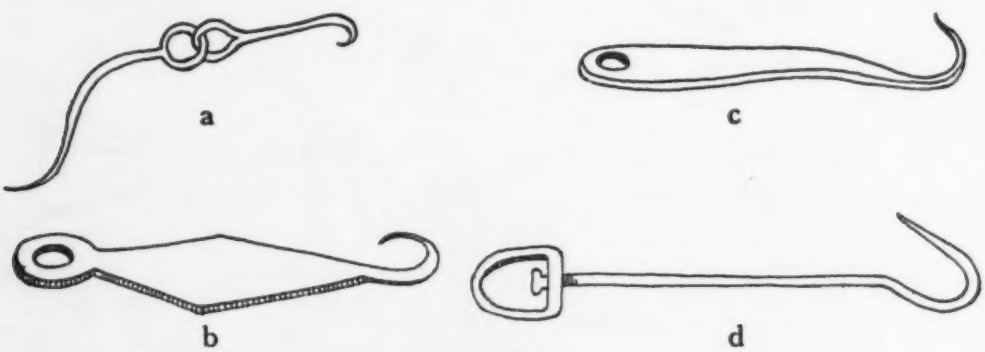


Fig. 12. Sail hooks: a, after Steel; b and c, Branson Collection, U. S. National Museum; d, author's collection.

similar to a carpenter's steel square. Its long leg was about twelve inches in length and the short leg about six inches, both divided into eighths of an inch usually, although some sailmakers preferred tenth divisions. Pencils completed the ordinary equipment but occasionally one finds a full set of drafting instruments including triangles and curves.

Duplicating the drafting tools were large sized tools used for laying the sail plan as lifted from the paper down on the sail loft floor. The tiny brass square had as its mate a *wooden square* with legs about six feet long. The counterpart of the dividers was a well-stretched cord with a pencil made fast at one end. The scale was supplanted on the loft floor by a hundred-foot *tape line* and a *yard stick,* both divided into feet and inches. In place of the tacks which held the paper plan flat, the canvas as it was laid down and cut was held in place with ordinary scratch *awls* stuck through the cloth into the loft floor.

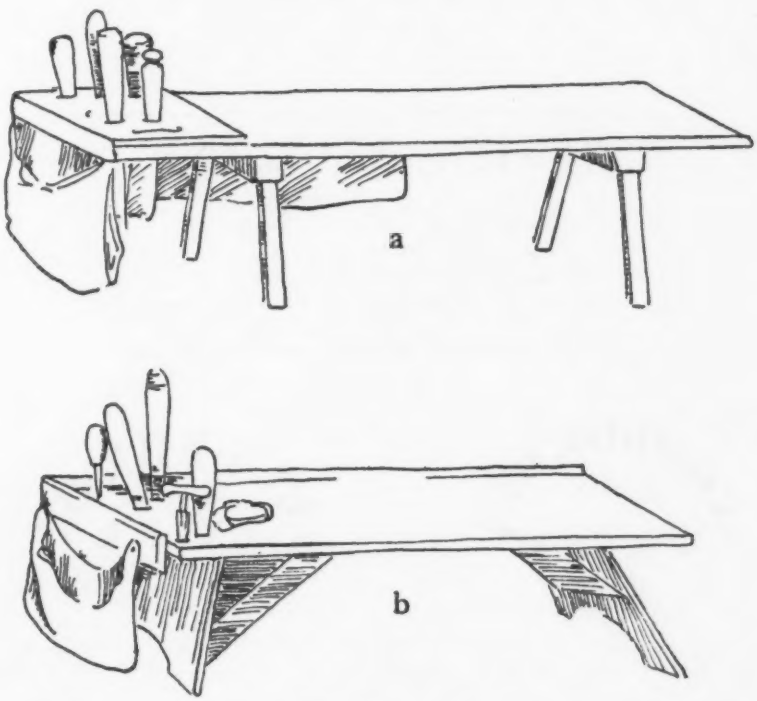
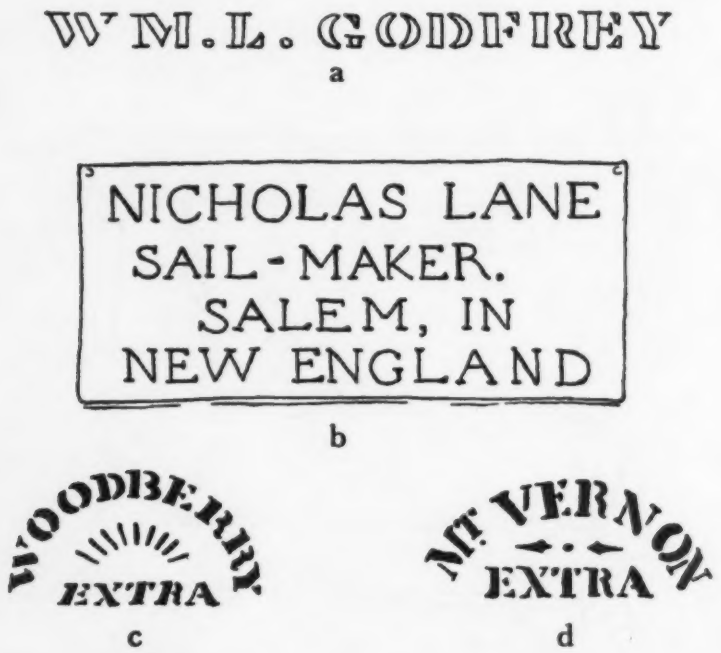


Fig. 13. Benches: a, ca. 1830-1840 in The Mariners' Museum; b, Wm. L. Godfrey's present bench.

Much of the sailmaker's work, the laying out and cutting, is done kneeling on the floor and stooping, but the finishing, roping, and seaming are performed while seated. In the course of time the sailmaker developed a *bench* (figure 13) as specialized as those of the cobbler and the shingle-maker. It was a simple wooden affair, usually about seven feet long. Generally the seat was bare but at times it had a small canvas pad which could slide along the seat. All the needed gear was grouped at the sailmaker's

right hand, resting in holes bored through the seat. Like the keyboard of a typewriter the gear assumed an arrangement with the most used piece in the handiest position. Some individualists, of course, varied their arrangements from the standard. The earliest picture of a bench complete with its gear so far found is that shown in Steel, reproduced in plate 30. A somewhat earlier bench, French in origin, is illustrated in Romme's *L'Art de la Voilure,* 1761-1789, but not only is the gear missing, there is



a b c d

Fig. 14. Labels: a, stencil used by Wm. L. Godfrey, Baltimore, 1946; b, woodblock stamp of Nicholas Lane, ca. 1790, Peabody Museum, Salem; c and d, stencils used by sail duck manufacturers, 1946.

also a complete absence of any place in the top of the bench for a single piece of it. Benches began to be issued by the United States Navy to its sailmakers, even those on shipboard, in 1844. Prior to that year every man apparently provided his own.

Seemingly few artisans take quite as much pride in their work as the sailmakers—never do they fail to either stencil (figure 14) or to sew a label bearing their name on a sail. There is, of course, a certain amount of advertising value in the practice and a well-cut sail is something in which to take no small pride. But actually the practice began as a matter of com-

pulsion. In the year 1736 as a means of reducing the quantity of sail cloth being smuggled into England, all sailmakers were required by law to indelibly place their name and address on every sail made. Thereby the customs officials could easily follow suspected cloth to its point of origin and collect either duties or heavy fines. From then until now the practice has been followed. The oldest of these markers known in the United States is a carved woodblock stamp, that of Nicholas Lane, ca. 1790, in the Peabody Museum, Salem (figure 14b). The mark used by present day sailmakers on sails for commercial vessels is usually a stencil (figure 14a) and the marks used on two of the leading brands of sailcloth are similar (figure 14c and d).

As in every trade there are certain little practices and trade tricks which have grown up over the years. The sailmaker has his own long-splices, eye-splices, and methods of making cringles. These were all developed because they particularly fitted the sailmakers' needs for rope work which could be drawn to an exact size. All of them have been so well described in *The Ashley Book of Knots* that it is useless to attempt a fresh description of them here. The sailmaker's method of knotting the end of his twine and twisting it is not well known. To make his knot the sailmaker threads the needle and then turns the thread around the blade with the standing part lying over the very end. This is pinched tightly with the left thumb and index finger, then the needle is pulled through the loop. The result is an overhand knot at the very end of the thread. The twist is put into the twine in one of two ways: first, by winding it in a close spiral around the shank of the needle from the eye to the point and then drawing the needle through the tube of thread so formed; or second, by holding the needle in the left hand while the right hand rolls the twine across the right thigh. The result of either method is a uniformly laid-up thread.

With so much specialized gear in use one might expect the place where the sailmaker practices his art to be particularly adapted to it. Quite the reverse is and has been the fact. His place of business usually occupied the top floor of a building, therefore the name 'loft'; but any smooth, dry, clean surface of fair size would serve. Although no full descriptions of early lofts appear to exist from the known evidence, little or no change seems to have taken place through the years: a different costume and the addition of electric lights and sewing machines would make Steel's 1794 sail loft (Plate 30) look the same as one in use today. One at Gloucester, Virginia, in 1768 was over a 'large warehouse' forty by twenty feet in size. Brown and Murphy in Baltimore in 1882 were working in one

twenty-six feet by seventy feet. The larger the floor the easier it is to lay down and to cut a big sail, but a sailmaker with a floor twenty by forty feet would not refuse an order for a sail with a foot of fifty feet in length and a hoist of eighty feet. He simply drew his plans and laid down in such a way that the sail could be made in sections and then assembled for roping and finishing. Many sail plans are to be found with these sections carefully delineated. At times not even a building was used, the sailmaker working out-of-doors in a meadow or the village green—as recently as 1945 the author saw a sailmaker near St. Johns, Antigua, seaming a new sail in the shade of a palm tree. Just such a sail loft, if it could be called that, was depicted in the 1719 Spanish manuscript reproduced in *Arquitectura Naval Española*.

The method of seaming sails was apparently described first by Mainwaring when he prepared his *Dictionary* about 1620-1623. He wrote,

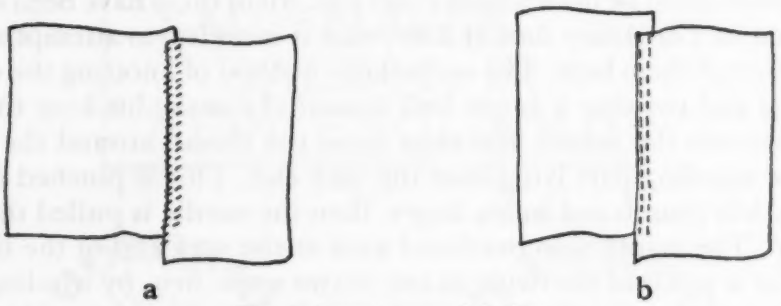


Fig. 15. Seams: a, round; b, flat.

'Monks—seams. This is a kind of sewing the canvases of the sails together when the edge of the one is sewn over the edge of the other, and so is sewn on both sides. This is the strongest way of sewing the sails.' All of this implied ways of seaming other than monks-seaming; no other methods, though, are described. The first edition of John Smith's *Sea Grammar* (not to be confused with his *Accidence* . . .) speaks of round seams in addition to monks, but the three types known today, round, flat, and monks, are not recorded until 1732 and then only by name without description. The sketches show the two real types; the monks-seam, of course, can be made up of two flat or two round or one round and one flat. Mainwaring gives no clews in his description as to the composition of his monks-seam. From his day until the nineteenth century, no definite description has been found and no actual sail of proven date is known to exist. Glascock, 1836, said a double flat seam was best; Alston, 1859,

and Branson, 1858, representing British and American opinion, both preferred a double round seam; Todd and Whall, 1890, concurred, and today when a sail is seamed by hand, the two round seams are used. In very heavy sails it was customary to 'stick' a third seam, a flat one, down the center of the overlap. In making up a very light sail using drill or some other wide material, good sailmakers customarily run a seam down the center of the cloth. This not only strengthens the sail but it also improves the appearance and helps the sail to remain in the shape the sailmaker originally gave it. If in doing this the sailmaker folds the cloth to form a seam the width of the regular seams and stitches each edge, the process is called 'middle seaming'; if he simply folds the cloth once and runs in a single row of stitching, a cheaper but by no means as good a method as the former, the seam is called a 'beading.'

American sailmakers customarily stitched from the foot to the head of a fore and aft sail and vice versa with square sails. In the latter the inner cloths overlapped the next outboard cloth on the fore side, while on fore and aft sails the after selvedges of each cloth were on the port side of the sail. Boltropes were always on the after side of a square sail and the port side of fore and aft sails. Stitching is always from left to right.

Once the sewing machine was developed, its introduction about 1890 throughout the American sail lofts was rapid. Three machine stitches are used: chain, straight, and zigzag. The first is almost worthless since if a single stitch breaks the whole seam comes out. The zigzag stitch is used only in light cloth, usually yacht sails. But even if largely made up by a modern electric-powered machine, all sails are still roped and finished by hand in the same way sailmakers have worked for centuries. With the use of sail now confined almost exclusively to pleasure craft, it seems very unlikely that any further development in the gear of the sailmaker will take place in the future.

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Collections

The Author. A complete group of old sailmaker's gear, largely from the Chesapeake Bay area.

Bourne Whaling Museum, New Bedford. The most extensive public collection including a replica of the Briggs & Beckman sail loft.

The Mariners' Museum, Newport News. A large collection with some very exceptional pieces.

The Peabody Museum, Salem. Collections acquired from a number of old Salem sailmakers including what is perhaps the oldest gear in the United States.

United States National Museum, Washington. The gear once used by Ware Branson, Jr., Sailmaker, U.S.N.

Notes

Four-masted Ships

A French privateer, *L'Invention* (468 tons, 135.4 x 27.4 x 14.1 feet) was built of wood at Bordeaux in 1801 and rigged with four masts having square sails on each mast.[1] She was captured when new by the British, but she seems to have exerted no influence on her contemporaries.

By 1875, the increase in size, particularly in length, of British iron sailing ships, owing both to the growth of commerce and to progress in the art of shipbuilding, had reached a point where in the conventional three-masted ship rig, even after the introduction of double topsails and topgallant sails, the size of individual sails was inconveniently large. In Glasgow, Scotland, in that year, accordingly, the firm of R. & J. Craig had Barclay, Curle & Co. build them the *County of Peebles* for the Indian jute trade (1691 tons, 266.6 x 38.7 x 23.4 feet), rigged as a four-masted ship. The new rig proved very satisfactory and practical in a number of ways. For the same sail area as a three-masted rig the center of effort was lower, with the result that the vessel heeled less in fresh winds and therefore carried more sail and steered better. Although more yards and sails were needed, those on the three forward masts could be made interchangeable, so that fewer spares had to be carried, and the rigging was lighter than on a three-masted ship. And four masts instead of three meant that the leverage of the square sails on fore and jigger was exerted nearer the ends of the ship, contributing greatly to the ease of tacking or wearing the vessel—a particularly important feature with a long iron hull.

[1] Lubbock, *Last of the Windjammers*, vol. 1, pp. 186-188; Sea Breezes, VIII, 101.

The *County of Peebles* was followed during the next twelve years by eleven more *Counties* for the same ownership, all larger but with the same rig; and other British shipowners were quick to follow the Craigs' example. Experience soon showed, however, that the yards on the fourth (jigger) mast were of little use and not worth the extra men that had to be carried to handle them, so that most large sailing vessels were rigged as four-masted barks, and many four-masted ships were so rerigged after their initial suit of sails had worn out. The number of four-masted ships was therefore limited; an accurate count at this late date is difficult owing both to the change in rig when the vessels were still quite new, and to the fact that the nomenclature of the two rigs was never absolutely standardized, but about ninety[2] such vessels were produced between 1875 and 1894, all the products of riggers in the United Kingdom.

Wright, Graham & Co., also of Glasgow, ran a fleet of seven four-masted ships, all named for falls; their first the *Falls of Clyde* in 1878 and their last the steel *Falls of Ettrick* (2264 tons, 278.3 x 42 x 24.4 feet) in 1894, the last of her kind ever built. The *Falls of Clyde* was bought by Captain William Matson of San Francisco in 1899, but he had the yards removed from her jigger mast, and the only four-masted ship ever to sail under the American flag was the *Katherine*, formerly *County of Linlithgow*, built of iron at Glasgow in 1887, which was bought from Chile by San Francisco owners early in 1916 and rebuilt as a six-masted motor schooner three years later.[3] Other former four-masted ships that came under United States registry were the six-masted barkentine *E. R.*

[2] Lubbock, op. cit., p. 189, says the number 'did not reach 100.' A list in *The Mariner's Mirror*, XIX (1933), 466-470, has over 100 names, but several four-masted barks seem to be included.

[3] Lyman, 'Six-masted Rigs,' The American Neptune, IV (1944), 326-326.

Sterling (built as the *Lord Wolseley*)[4] and the four-masted bark *Fort George*, which was built at Belfast, Ireland, in 1884. The *Drumburton* (1891 tons), built at Port Glasgow in 1881, was registered out of Victoria, British Columbia, under San Francisco ownership from 1900 until 1904, and was the only four-masted ship ever under the Canadian flag.

In 1889 the former French mail steamer *Periere*, originally built of iron at Glasgow in 1866 (2785 tons, 356 x 43.8 x 27.3 feet), was converted to a four-masted ship under the name *Lancing*. After a short career under British ownership, she went to Norwegian operators who developed her sailing qualities to an extent that made her possibly the fastest large sailing vessel ever afloat. The *Lancing* was the pride of the Norwegian merchant marine until 1924, when she was scrapped in Italy, being at that time the last representative of her rig in existence. The Peruvian four-masted bark *Omega* (built in 1887 as *Drumcliff*), which is still trading, and the Soviet *Tovarisch* (built in 1892 as *Lauriston*), which may still be afloat, both began as four-masted ships.

The *Ville de Paris*, a sister of the *Periere*, built in 1865, was refitted under the same rig a few months after the *Lancing* as the *H. Hackfeld* for German owners; but without the conspicious success of the other. Beside her the only examples of the rig in the German merchant marine were the iron *Frieda* (formerly *County of Edinburgh* of 1885) and the steel *Peter Rickmers*. The latter (2958 tons, 332 x 44.4 x 25.4 feet) was built by Russel of Port Glasgow in 1889 for the rice trade between Indo-China and Germany around Good Hope; she was given a loftier rig than Cape Horn vessels, with double topgallants and a skysail yard on each mast: more yards than have ever been carried on four masts by any other vessel and only two fewer than carried by the five-masted ship *Preussen*.[5]

[4] Ibid.

[5] Lyman, 'Five-masted Square-riggers,' THE AMERICAN NEPTUNE, VI (1946), 135-136.

Some four-masted ships were built in Glasgow for a French owner: *Union*, 1882; *A. D. Bordes*, 1884; *Perseverance* and *Tarapaca*, 1886. The *Union* first had two small auxiliary steam engines with twin screws, but these were quickly discarded and the experiment was not repeated in the later vessels.

The largest British ship in 1884 was the *Palgrave* (3187 tons, 322.5 x 49.2 x 25.4 feet), an iron four-masted ship built at Port Glasgow by W. Hamilton. Her title passed in 1889 to the *Liverpool* (3400 tons, 333.2 x 47.9 x 26.5 feet), built by Russell of steel beams and iron plates, and rigged as a four-masted ship with only royals over single topgallants. She held the palm for size until 1892, but after her time the largest British sailing ship was always a four-masted bark.

The smallest iron four-masted ship was probably the *Northam* (1500 tons), originally built at Southampton in 1858 and converted from a P. & O. steamer in 1877.

Several four-masted ships, including the *Palgrave*, carried two skysail yards, invariably on main and mizzen, thus preserving some of the traditional triangular outline of the full-rigged ship. Like the *Palgrave* also, the topgallant on the jigger was often single when the others were doubled; indeed, the *County of Kinross* and four of her near-sisters had a single jigger topsail.

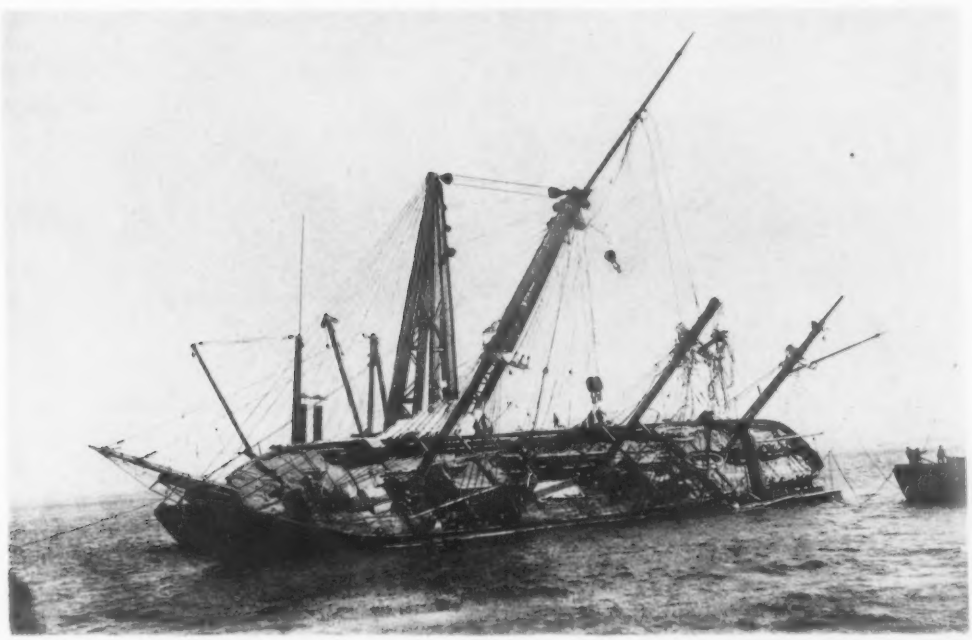
JOHN LYMAN

THE STEAMER *Queen of St. Johns*

IN steamboat days the river distance between Jacksonville and Sanford, Florida, was 205 miles, but during the nineties and later the upper river was considerably shortened by cutting out Revolving Bend, straightening out the three S's, and trimming a number of points, so that the distance now is 183 miles. As to draft, 10 feet could be carried as far as the south end of Lake George, where there was only five feet of water on Volusia Bar; but now that steamboats are all

Four-masted ship *Waterloo*

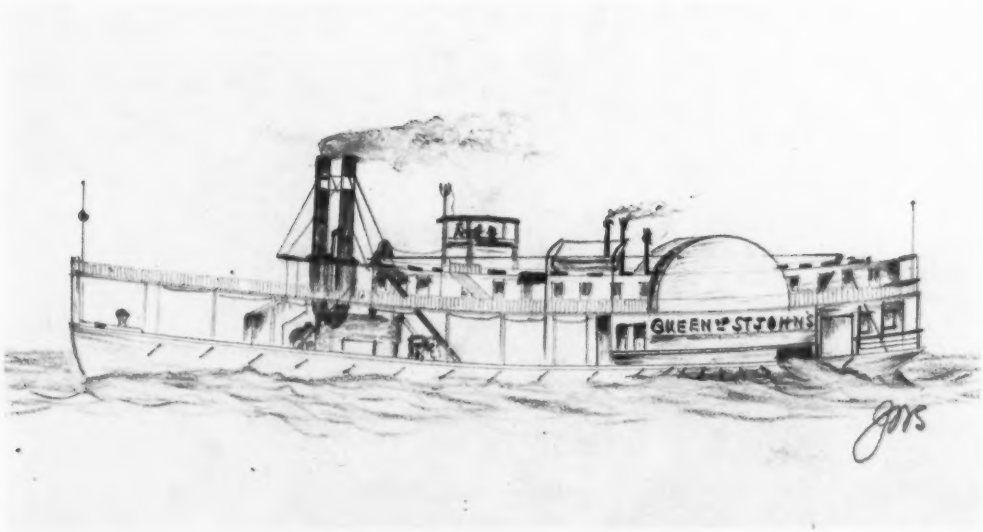
Reproduced from a photograph by Allen's Studio, San Francisco



Raising bark *La Escocesa*, which capsized and sank off Robbins Reef Light, 23 March 1899

Reproduced from a photograph by Merritt, Chapman and Scott in the collection of Charles S. Morgan. For an account of the vessel, see Harold D. Huycke, 'The Scottish Lady,' THE AMERICAN NEPTUNE, *VII (1947), 288-297*

Steamer *Queen of St. Johns* as originally built in 1884
Reproduced from a drawing by J. W. Somerville



Steamer *Queen of St. Johns* converted into a side-wheeler
Reproduced from a drawing by J. W. Somerville

gone and this trade has passed into history, one can carry 13 feet to Palatka and last spring bids were opened to dredge 1,255,400 yards at $123,656.90, giving the river a 10-foot depth between Palatka and Astor. More recently the President released the funds to dredge the river between Astor and Sanford, giving at least a 10-foot depth all the way up.

So while it is almost twenty years since steamboating on the St. Johns River passed into history, it is to be hoped that this improvement may bring back some degree of navigation and use of the beautiful river.

During the time of which I write there was such a feverish heat for more boats for the river that proper details were not considered nor gone into. The new steamer *Chesapeake,* 188 feet long, built at Harmar, Ohio, in 1883, had been brought down and put on this river under the name of the St. Johns River Transportation Co.; and with the business at its height the operators considered they needed another boat to run opposite her, so *Queen of St. Johns* was contracted for and built at Cincinnati, Ohio, in 1884. She was 192 feet long, but as she was built as a propellor, drawing 8 feet (her hull drawing 5, and a 3-foot skeg covering a 7½-foot wheel), when sent up the river on her first trip she could only get as far as Volusia Bar on account of there being only 5 feet of water there. So she was brought back to Jacksonville and during that summer she was converted into a side wheeler. Under this equipment she proved to be very fast so she took up her run under Captain Wood, along with *Chesapeake.*

The schedule was arranged for these boats to leave Jacksonville at 8:30 A.M. and try to make the run through by day time, but that was impossible on account of the distance, crooked river, stops, etc.

The height of the steamboat boom on the river was reached during the winter of 1886-1887, and the decline thereafter was fast, as the railroad had been completed through to Sanford. When conditions had arrived at which these steamers could not operate *Chesapeake* was sold and was sent to St. Louis. Then *Queen of St. Johns* was sent to Wilmington, North Carolina, under Captain Charles Brooks, to run on the Cape Fear River between Wilmington and Fayetteville, but was burned there during 1889.

J. W. SOMERVILLE

The Killick

In a search through a rather large nautical library very little information could be found regarding that makeshift old anchor so often used by the New England fishermen in days gone by. This home-made anchor was called a killick, but from whence arose this odd name, no definite explanation could be found. In only one book was there a picture of this primitive anchor shown and it was a rather strange coincidence that this picture was taken from a photograph made by the Reverend Charles E. Park at New Harbor, Maine, and the killick illustrated here (Plate 30) was taken in the same town some years later. The former picture was published in *Goin' Fishin'* by Wesley George Pierce (Salem: Marine Research Society, 1934) and in this book is one of the few published descriptions of the killick.[1]

In Joanna Carver Colcord's *Sea Language Comes Ashore,* the killick is described as, 'a stone used as an anchor by small boats.' 'Used ashore [the word] in the phrase "up killick," meaning to stand off in a hurry.'

In the early days an iron anchor was an expensive luxury and the inventive New England fisherman, as a matter of economy, made his own anchor with the material that was always handy along

[1] The Peabody Museum of Salem owns three killicks, which were mentioned (but not illustrated) by John Robinson in *The Marine Room of the Peabody Museum of Salem* (Salem, 1921), p. 130.

his shore. The killick was used not only to anchor boats but also the large nets employed for off shore fishing. Even today one sees these ancient relics used in the small lobster boats on the coast of Maine, east of Portland.

The construction of a killick was not a very complicated matter, and while rather crude and while no two of these anchors were exactly similar, they were extremely serviceable. Many a small boat rode out a storm using the killick as a ground tackle.

It was only necessary to find three pieces of suitable material to construct a killick; 1) a 'Y' shaped limb of a stout tree, 2) an oblong shaped flat rock, 3) a flat board of sufficient length to fasten to the arms of the 'Y' and at right angle to the large stone that was placed in the crotch of the 'Y.'

The 'Y' shaped timber in the illustration is about five feet long, the stone that is placed in the crotch of the 'Y' is about three feet long, eighteen inches wide and about six inches thick. The cross piece of lumber placed across the two arms of the 'Y' is a board (and at right angle to the stone) about the same length as the stone and is pointed on each end and is fastened to the ends of the crotched limbs by two holes made in it and fitted over the ends of the two arms of the 'Y' and held in place by two pegs driven through the protruding ends of the 'Y.' In this way an anchor with four flukes is made and there is no metal used in its construction. While the killick was very serviceable, its one disadvantage was that after being dropped overboard, it had a bad habit of 'fouling' on the bottom. To overcome this the anchor line was made fast to the base of the killick and was served with a bit of light line at the top of the shaft of the 'Y.' Then, if the killick fouled on the bottom, the light line could be broken by a sudden jerk and the killick could be hauled up, wrong end first; a rather crude but effectual way of 'tripping the anchor.'

E. LEE DORSETT

Exodus 1947 Takes on her Cargo

[The Editors of The American Neptune have received a communication, excerpts of which appear below, from an English correspondent who, in July 1947, witnessed the 'secret' embarkation of Jewish refugees on the former Chesapeake Bay steamer *President Warfield* at the Mediterranean port of Sête. His letter was prompted by reading *'Exodus 1947*, An Interim Report on the Career of the Steamer *President Warfield'* by Alexander Crosby Brown, The American Neptune, VIII (1948), 127-131, as reprinted by the Baltimore Steam Packet Company. This article concluded with the speculation that the *Warfield's* hull might still be sound and that she might go on to further adventures. However, advice received from the Israel Government, Port of Haifa Authority, dated 27 June 1949, states that the steamboat is still moored to the breakwater of Haifa Harbor where the British left her and 'is no longer seaworthy.']

London, 23 May 1949

Dear Sirs:

I was most interested to read your account of the *President Warfield*. I had no idea that she was only twenty years old. My recognition was correct as I thought she was a Chesapeake Bay steamer but I erroneously thought she had a wooden hull and was at least fifty years old. The design tradition of local steamers perpetuates and dies hard. . . .

The only occasion when I saw her—and photographed her—was when she was loading her passengers at Sête. Merely by chance my wife and I were motoring through from the Pyrenees on our way to a small village near Cannes. We were taking the coast road and decided to stay the night at Sête. The hotel there is situated alongside one of the canals which is usually filled with barges loading casks of wine for the interior. At a very early hour we were awakened by a continuous procession of motor trucks bumping their way along the jetty. We

went on to our verandah to see what was happening—I thought it might be a record shipment of wine—and we were greeted with this extraordinary sight of very dilapidated cammions filled with brown, husky humanity, shouting their way to the old port. As Sête is a hotbed of Communism, the local inhabitants were joining in with exhortations and much waving of red flags. After breakfast we went to the old port where I first saw the *Warfield* or *Exodus* as she was then. She was flying the Honduran flag. We went on to the jetty where these motley thousands were embarking (and a jolly healthy young crowd they were too!) and engaged some French fishermen in conversation. These fisherfolk informed me that the ship was bound to Venezuela with these displaced persons.

Loudspeakers on the upper deck were bawling out instructions in German and Polish, while well—perhaps overdressed—swarthy men attached to a sumptuous new car, were issuing what I suppose were tickets to those going aboard. We thought then what a shocking traffic in human hopes. Evidently many were making large sums of money out of these unfortunate people's misery but why could they not do the straight forward thing and declare their illegality?

We returned after lunch to see the *Warfield* loaded to the gunwales with humans, and shortly after she cast off. With binoculars I followed her out to sea and when she was about three miles offshore she set her course just about 180 degrees from the direction of Venezuela—unless one might suppose that the Suez-Cape Horn route was preferred.

The Communists gave them a great send off. There were only a few French gendarmes about and they evidenced neither interest nor enthusiasm.

About a week later I dropped into a shop in Monaco to buy a newspaper and it was then that I read the story about the *Exodus* and her failure to land her passengers in Palestine.

However, it is a good thing that those days are over. . . .

H. C. TIMEWELL

Captain McGiffin and the Battle of the Yalu

Mr. Forrest tells us that Captain McGiffin entered Chinese service in 1885 and then goes on to say that he 'drew plans' for *Ting Yuen* and *Chen Yuen* and was sent to superintend their construction in England.[1] These two ships were, however, built in Germany (at Stettin) and launched in 1881 and 1882. It is perhaps possible that Captain McGiffin supervised the building of the two cruisers *Chih Yuen* and *Ching Yuen* in England (at Elswick) in 1886, but it is unlikely that their plans were due to anyone except Armstrongs' own designer.

The statement that 'the Japanese never reported their loss' can hardly be correct. I have a cutting from an English newspaper of somewhere about 1902 which begins by saying that 'Japan has recently published an official history of the war with China in 1894-1895. Among other interesting details are those of the losses suffered—in the naval battle of Yalu.' The totals then given are 90 killed and 208 wounded, whereas Wilson's *Ironclads in Action*, published in 1897, gave 90 and 204. The same author's later work, *Battleships in Action*, gives details from Japanese official sources of the Chinese losses, these being 718 killed or drowned and 122 wounded.

R. C. ANDERSON

[1] The American Neptune, VIII (1948), 268.

Queries and Answers

92. Round Tops in America. I rather doubt if the words 'round Tops' in the contract of 1774 for the ship *Lord Dartmouth* can be taken as proving that the tops were to be round in the strict sense of circular in plan; it seems quite possible that 'round top' (which appears in a semi-official list of 1689) may have lingered as a name for a structure more elaborate than mere trestletrees and crosstrees without meaning that it was still actually circular. 'Fighting top' was probably used in much the same way for some little time after the use of machine guns in the tops had been abandoned.

Perhaps my end-date of 1720 for round tops was a little early, though I feel sure that *some* ships had tops with a straight after edge several years before then. In this connection Blanckley's *Naval Expositor* is helpful. It defines a Top as 'a round frame of Boards . . . ,' but the small marginal illustration shows a top not far removed from a rectangle, with only a slight curve on the fore side and a slight blunting of the two fore corners. Now Blanckley's book was published in 1750, but the manuscript, which came to light in 1930, was dated January 1732/3 and was not illustrated. It would seem, therefore, that the new fashion became definitely established between those dates.

R. C. ANDERSON

94. Sailors' Alphabet. Mr. Scott J. Dow has recently written me: 'In my early sea days, I was able to repeat the letters of the alphabet and follow with appropriate words representing some part of the ship. As far as I am now able to remember is up to and including the letter G.

A is the Anchor which holds our good ship,
B is the Bowsprit which never will split,
C is the Capstan where the sailors run round,
D is the Davit from which our jolly boat hangs,
E is the Ensign which flies from the mast,
F is the Foucastle where the crew make their bunks,
G is the Gangway where the mate takes his stand,
H is the Halyard . . .

I hope you can complete the list.' I was able to send him a somewhat similar alphabet, written down in May 1925 by Mr. Fred Phippen of Isleford, Maine, which was published in Fannie Hardy Eckstorm and Mary Winslow Smyth, *Minstrelsy of Maine* (Boston: Houghton Mifflin Co., 1927), pp. 233-234. Can any readers of the Neptune supply other versions?

JOANNA C. COLCORD

95. Marianist Centennial. The Marianist religious order is this year celebrating the hundredth anniversary of their coming from France to America. The pioneers of the order came on the ship *Ohio* [738 tons, built in 1840] which arrived at New York from Havre on 3 July 1849, and the ship *Alfred,* which arrived at New York from Havre 27 November 1849, with 62 passengers in the steerage and merchandise for William Whitlock, Jr. Can any reader supply information regarding paintings or prints of these ships?

BROTHER PAUL O'BRIEN

Book Reviews

WILLIAM BELL CLARK, *Captain Dauntless: The Story of Nicholas Biddle of the Continental Navy* (Baton Rouge: Louisiana State University Press, 1949). x + 317 pages, 9 plates. Cloth. $4.50.

Certainly no one living today has as wide or as intensive a knowledge of the operations and *dramatis personae* of the Revolutionary Navies as William Bell Clark. In fact, it is doubtful if any single individual living during the years 1774-1785 had such detailed information on contemporary naval affairs as Mr. Clark has 175 years later. There is scarcely a pertinent collection of letters or documents here or abroad or a newspaper published in a seaport town which he has not studied, indexed, and cross indexed.

His years of study have so far produced three full-length biographies of Revolutionary naval commanders and others are to come. Those published are of Lambert Wickes [Yale University Press, 1932] who bearded the British lion in his den long before the much publicized John Paul Jones; of John Barry [Macmillan, 1938] who for the first time had his story told in full and without bias; and now of Nicholas Biddle, the American seaman who learned his ropes alongside the future Lord Nelson and rose to command one of our first frigates.

Few of us have heard of Biddle—if the name be mentioned we are likely to think of Philadelphia society and bankers and if we connect the name with the Navy at all, we probably recall the nineteenth-century commodore, James. Nor is that surprising because the great bulk of Nicholas Biddle's papers must have gone in the holocaust which cost him his life and completely destroyed his command, the frigate *Randolph*. The painstaking care, then, with which Mr. Clark has pieced together the story from the few extant letters and the tiny bits of material scattered from Charleston, Philadelphia, and New London to old London is a veritable tour de force. All of it is so carefully documented that there can be no question of the authenticity of a single bit.

But the detail with which the story is told has not hurt the telling. Biddle, common seaman of the wrecked snow *Ann and Almack* in the Bay of Honduras; Biddle, coxswain of the gig of H.M.S. *Carcass* feeling his way through Polar ice; Biddle, commander of the Pennsylvania row galley *Franklin*, of the Continental brig *Andrew Doria*, and of the frigate *Randolph* is full of life. Paul Jones demanded a fast vessel when he went 'in harm's way'; Biddle went there in whatever his orders gave him. At the outset of his naval career he wrote, 'I aim for a Character of Conduct as well as Courage And hope never to throw away the Vessel and Crew merely to Convince the world I have Courage.' His every action, so well told by Mr. Clark, proves he reached his goal, and when at the end in the most complete loss suffered by the Continental Navy he lost his life and command fighting against awesome odds, he set a tradition which the men of the *Hoel, Johnston,* and *Samuel B. Roberts* showed in 1944 is still alive.

The book itself is well made. It has a good index and a bibliography which is almost a guide to Revolutionary naval history up to early 1778.

DAVID KLEIN AND MARY LOUISE JOHNSON, *They Took to the Sea* (New Brunswick: Rutgers University Press, 1948). 8⅛″ x 5¾″, cloth. viii + 342 pages, 8 illustrations. $3.75.

This is a most entertaining survey of the motives and experiences of that oddly appealing aristocracy of souls who have gone to sea in small craft, either alone or in the unalterable company of one or two other people. The book, an attractive one, is divided into ten chapters, each of which deals with an aspect of the subject—'Men and Motives,' 'A Ship to Sail In,' 'Sextant and Marlinspike,' 'Escapes and Disasters' are some—and each aspect is thoroughly replete with problems and excitement. The greater part of the text consists of excerpts from the personal accounts of about a dozen small-boat mariners, including such notables as Joshua Slocum, Rockwell Kent, and Jack London. These are woven into a running narrative by the sympathetic interpolations of Mr. Klein and Miss Johnson, who lead one from the most lyric to the most lugubrious experiences and back again with considerable skill. There is hardly a page that does not contain some interesting or amusing or hair-raising incident, and it is difficult to pick out the more noteworthy. Dwight Long's account of a storm he encountered while on a run from Pago Pago to New Zealand is among the most terrifyingly vivid pictures of raging seas and menacing shoals; Erling Tambs' near-disaster when his dinghy went adrift and left him stranded on an uninhabited island, separated by a sea of sharks from the boat where his wife and child were sleeping, was perhaps unique. By a remarkable brand of luck he drifted out to them on a rapidly disintegrating brushwood raft. Marin-Marie trying to take motion pictures of himself in the solitude of the mid-Atlantic has its elements of humor. Richard Maury and William Robinson convincingly describe the exhilaration of the down-hill run before the Trade Winds, and Robinson the delights of going native in the Galapagos, until he had acute appendicitis. The authors have had a good time skimming cream from the narratives of these sailors, and the book is an incentive to the reader to go to the sources for more. With this in mind they have appended a bibliography—not intended to be comprehensive—of sixty-four books which they consider particularly good reading.

HENRY B. BIGELOW AND W. T. EDMONDSON, *Wind Waves at Sea, Breakers and Surf* (Washington: Hydrographic Office Publication No. 602, 1947). 6″ x 9¼″, cloth. xii + 177 pages, 37 tables, 57 illustrations, 24 plates. $2.80.

This book is an outgrowth of the extensive research into the nature and action of ocean waves which was carried out during World War II in connection with the amphibious operations of the armed forces. Studies were made under Navy contracts with the Woods Hole Oceanographic Institution, the Scripps Institution of Oceanography, and the Department of Mechanical Engineering of the University of California, and by the Beach Erosion Board of the Army Engineers. *Wind Waves at Sea, Breakers and Surf* is a non-technical presentation of the results of these stud-

ies, as well as the combined observations of seafaring men over a period of many years. It is a lucid, very readable discussion of the action of wind and water throughout the oceans of the world, both in terms of regional and seasonal conditions, and synoptically, as modified by beaches, shoals, reefs, lighthouses, etc. The illustrations and diagrams are plentiful and good, and it is a compact reference book for navigators as well as a worth-while summary of existing knowledge of the subject for anyone interested in the ocean. Dr. Bigelow, who has spent the better part of a long life in the field, is known as 'The Dean of American Oceanography.' Dr. Edmondson took part throughout the war years in investigations carried on under the Navy's program.

LLOYD A. BROWN, *The Story of Maps* (Boston: Little, Brown and Company, 1949). 7¼″ x 10″, cloth. xix + 397 pages, 40 plates, text figures. $7.50.

The earliest subscribers to THE AMERICAN NEPTUNE will recall the article 'Manuscript Maps in the William L. Clements Library,' which Mr. Lloyd A. Brown contributed to the April 1941 issue when he was Curator of Maps at that library. Although he subsequently exchanged that specialized post for the librarianship of the Peabody Institute in Baltimore, his interest in maps remained constant, and he has now produced a magnificent survey history of cartography—thoroughly readable yet carefully documented.

Everyone who leaves home uses maps of some kind, yet the history of the subject is practically unknown to the general reader. Mr. Brown, who in addition to his library duties in Baltimore is Lecturer in Cartography at Johns Hopkins, has effectively eliminated any excuse for such continued ignorance, for he sets forth the experience of man, from the earliest times to the present, in determining the size and form of the world and of reducing this knowledge to manageable form. Although his book is equally concerned with the cartography of land and sea, the sections dealing with methods of determining latitude and longitude and with the development of sea charts will prove of special value to anyone seriously interested in maritime history. Mr. Brown covers a vast field, yet he explains the evolution of cartography in sufficient detail, and contrives to do so in an agreeable and entertaining manner. His well-chosen illustrations are excellently reproduced, in keeping with the high standard of book making furnished by his publishers.

EDWARD CHASE KIRKLAND, *Men, Cities and Transportation, A Study in New England History* (Cambridge: Harvard University Press, 1948). 6″ x 9¼″, cloth. 2 vols. xvi + 528 and ix + 499 pages, 36 plates, 9 maps. $12.50.

Professor Kirkland of Bowdoin College, in an effort 'to rescue New England history from the colonial era,' has tackled the complex story of New England transportation by land and sea between the years 1820 and 1890. Writing under the auspices of the Committee on Research in Economic History of the Social Science Research Council, he has produced a monumental study of the development of railroads in New England and their effect upon other forms of transportation. Although he and his publishers have seriously tried to make the work palatable, no

one could claim that *Men, Cities and Transportation* is light reading. It is, however, a valuable corrective to much romantic nonsense that is written about both sailing vessels and steamboats, for ships are treated in it as useful elements in New England transportation rather than as ends in themselves, which they never were. Those enthusiasts who bewail the passing of certain types of craft that are particularly close to their hearts will at least learn from Professor Kirkland the complexity of the economic pattern that led to the changes which they deplore. Other readers, who lack such strongly marked preferences in transportation, will find the book an invaluable source of information about a vital phase of nineteenth-century New England history.

CARL D. LANE, *The Cruiser's Manual, A Complete Handbook on Sail and Motor Cruising* (New York: W. W. Norton and Company, Inc., 1949). 5½" x 8⅜", cloth. 432 pages, numerous text figures. $3.95.

CARL D. LANE AND JOHN MONTGOMERY, *Navigation the easy way* (New York: W. W. Norton and Company, Inc., 1949). 6⅛" x 9¼", cloth. 126 pages, numerous text figures. $2.95.

RUSSELL K. JONES AND C. MCKIM NORTON, *The Cruising Cookbook, Easy-to-Cook Meals on a Two-Burner Stove* (New York: W. W. Norton and Company, Inc., 1949). 5⅜" x 7⅞", cloth. 302 pages. $2.95.

In these three Norton 'how-to-do-it' books about cruising, much valuable information is presented in compact and palatable form. Mr. Carl D. Lane's *Manual* proceeds from the question 'Why cruise?' through most of the phases of selection, operation and use of cruising boats. The work of a man of experience, it is thorough, useful, and frequently entertaining. In *Navigation the easy way,* Mr. Lane collaborates with Mr. John Montgomery in offering the intelligent ignoramus a simplified approach to navigation based upon methods used during the recent war by the Navy and Air Force in teaching the subject 'in a hurry to men with no mathematical background and little or no sea or flight experience.' *The Cruising Cookbook* will prove a blessing to sailors whose imagination soars above sandwiches and canned goods. The recipes are varied and interesting, yet they are practical for a two-burner stove and can be prepared in a reasonable time. They take full advantage of the use of pressure cookers, which bring so many good dishes within reasonable limits of cooking time.

RICHARD LEBARON BOWEN, JR., *Arab Dhows of Eastern Arabia* (Rehoboth, Mass.: Privately printed, 1949). 7" x 10", paper wrappers. x + 54 pages, 19 collotype illustrations, 18 line drawings. $2.75.

A reprint of the article of the same title published in the April 1949 issue of the NEPTUNE, with additional bibliographical material and an index, which may be ordered from the author at 173 Columbus Avenue, Pawtucket, Rhode Island.

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